

Fig. 1A.

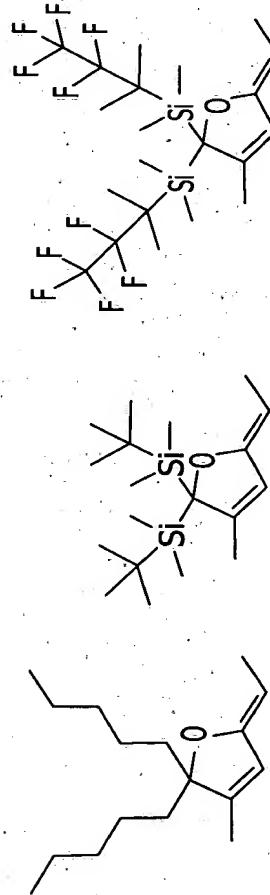


Fig. 1B.

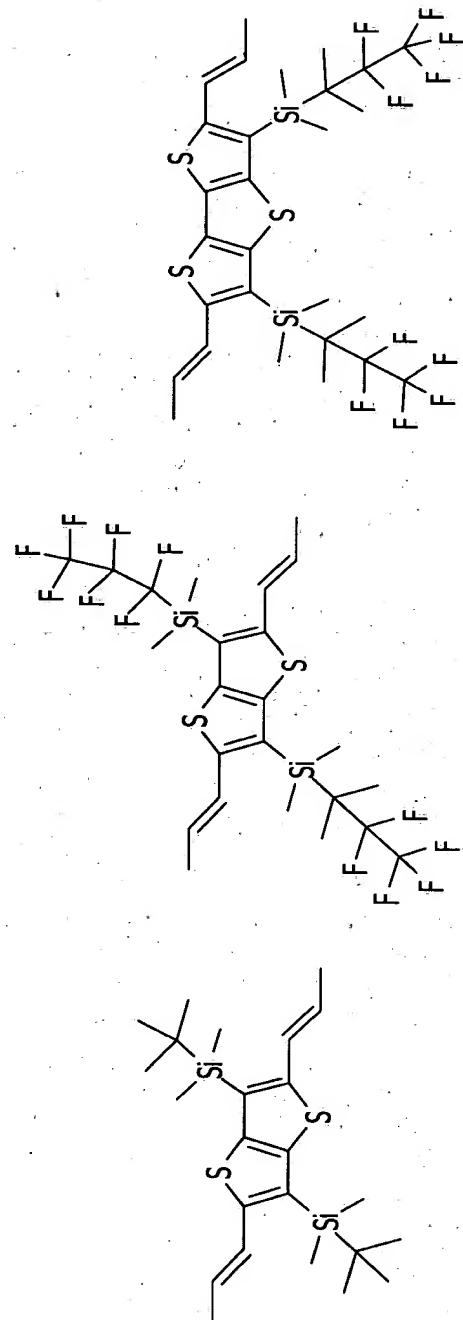


Fig. 1C.

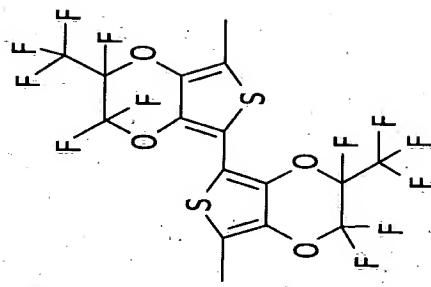


Fig. 1D.

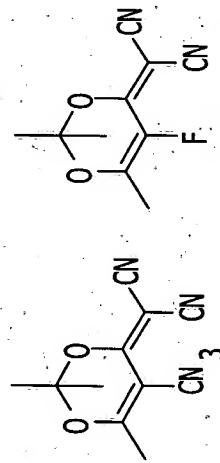
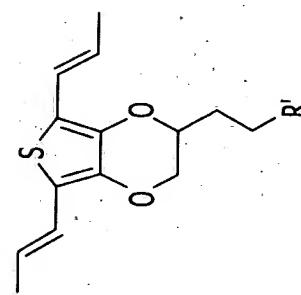
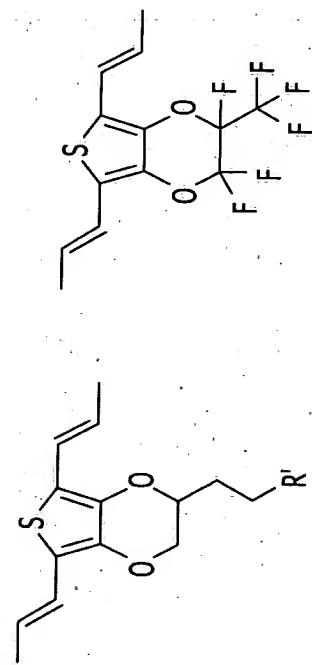
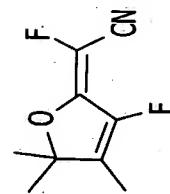
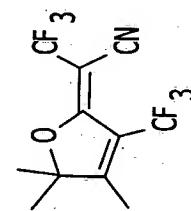
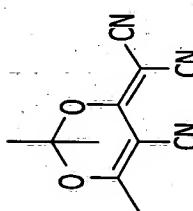
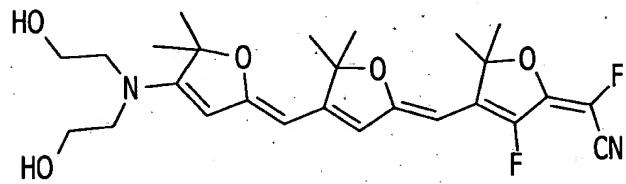


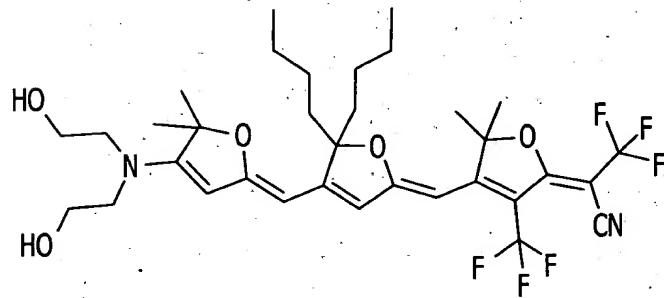
Fig. 1E.



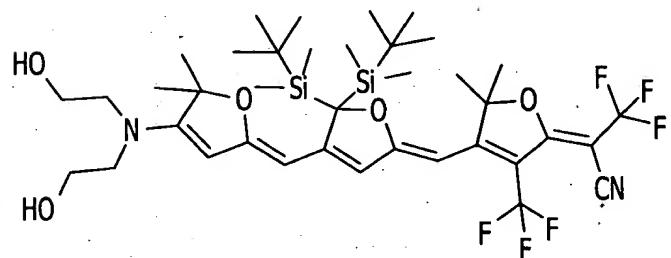
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*Fig. 2A.*



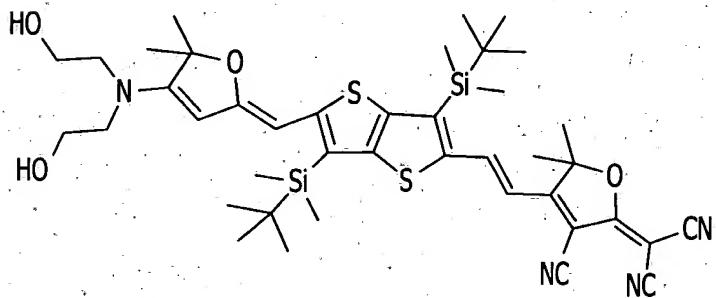
*Fig. 2B.*



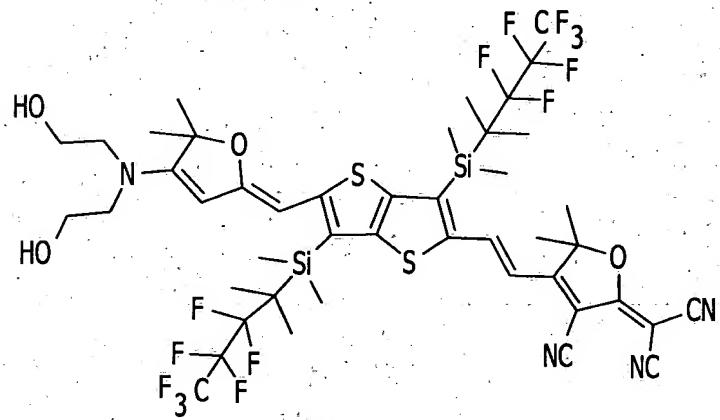
*Fig. 2C.*

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*Fig. 2D.*



*Fig. 2E.*

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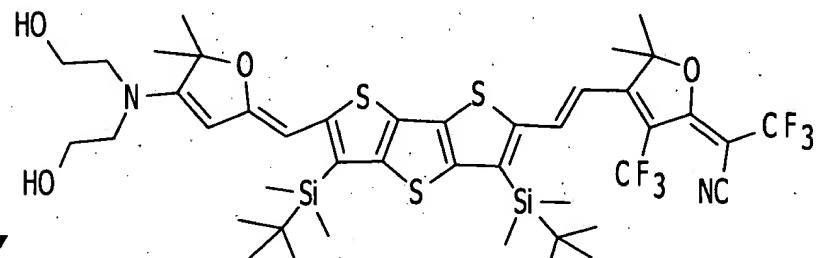


Fig. 2F.

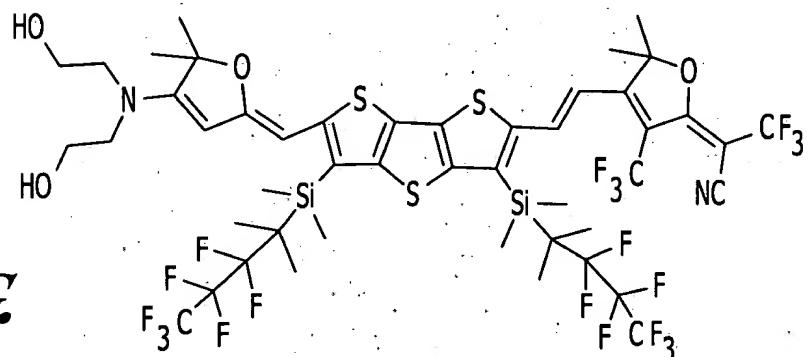


Fig. 2G.

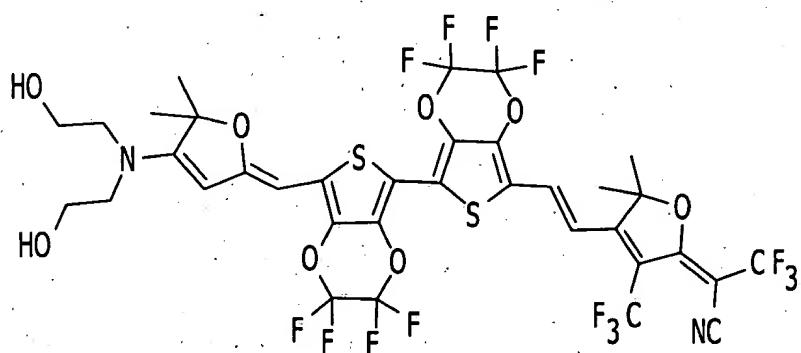


Fig. 2H.

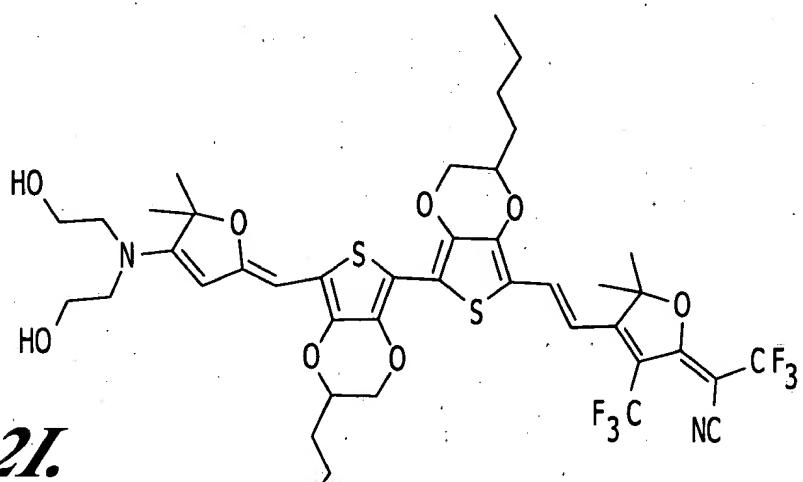


Fig. 2I.

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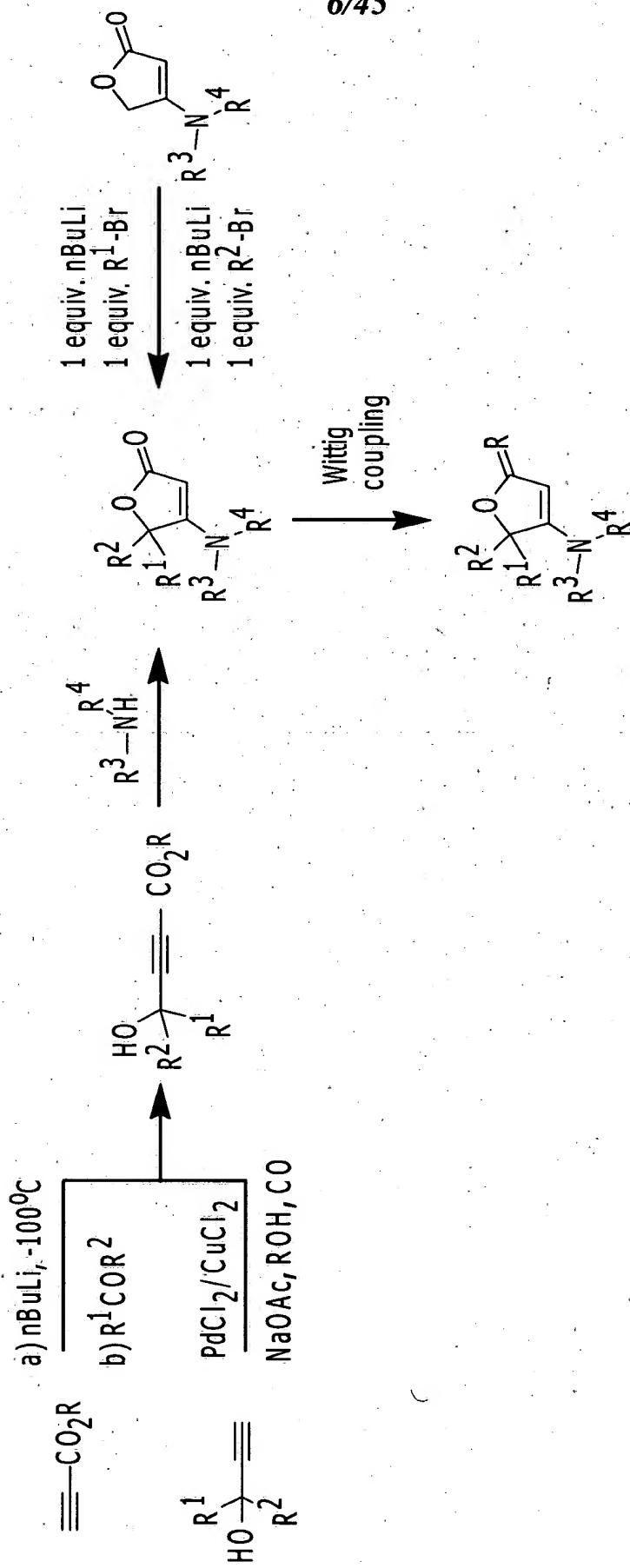


Fig. 3.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
Docket No.: UOFW117403

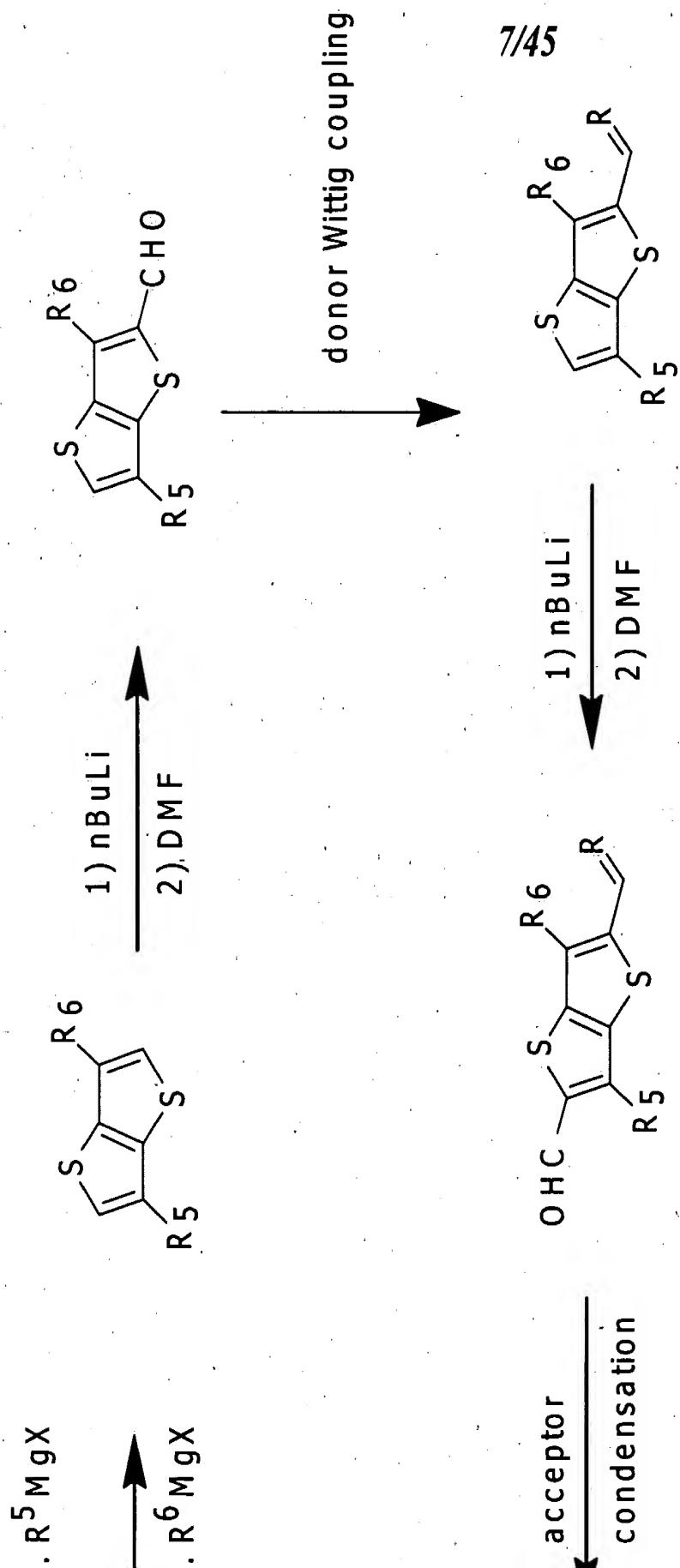
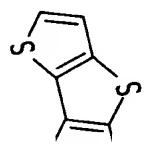
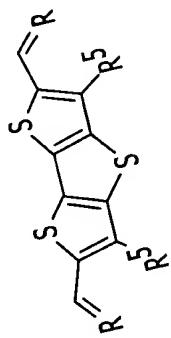
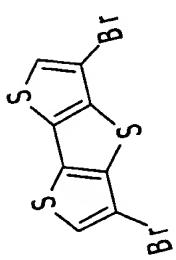
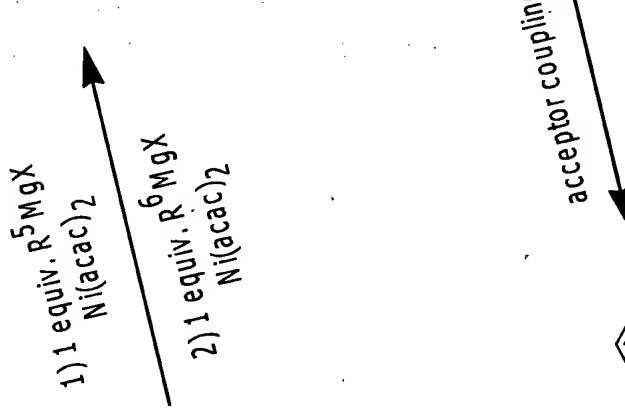
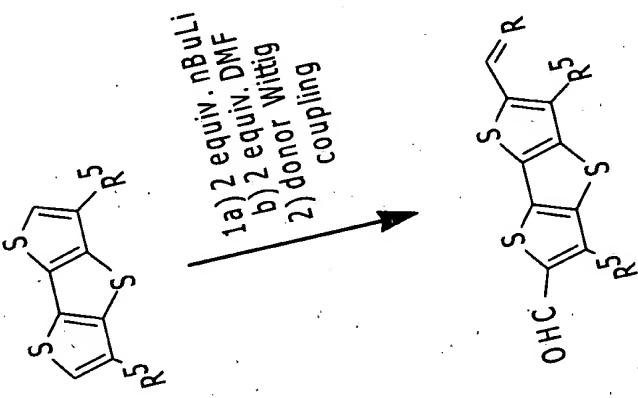


Fig. 4.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
Docket No.: UOFW117403

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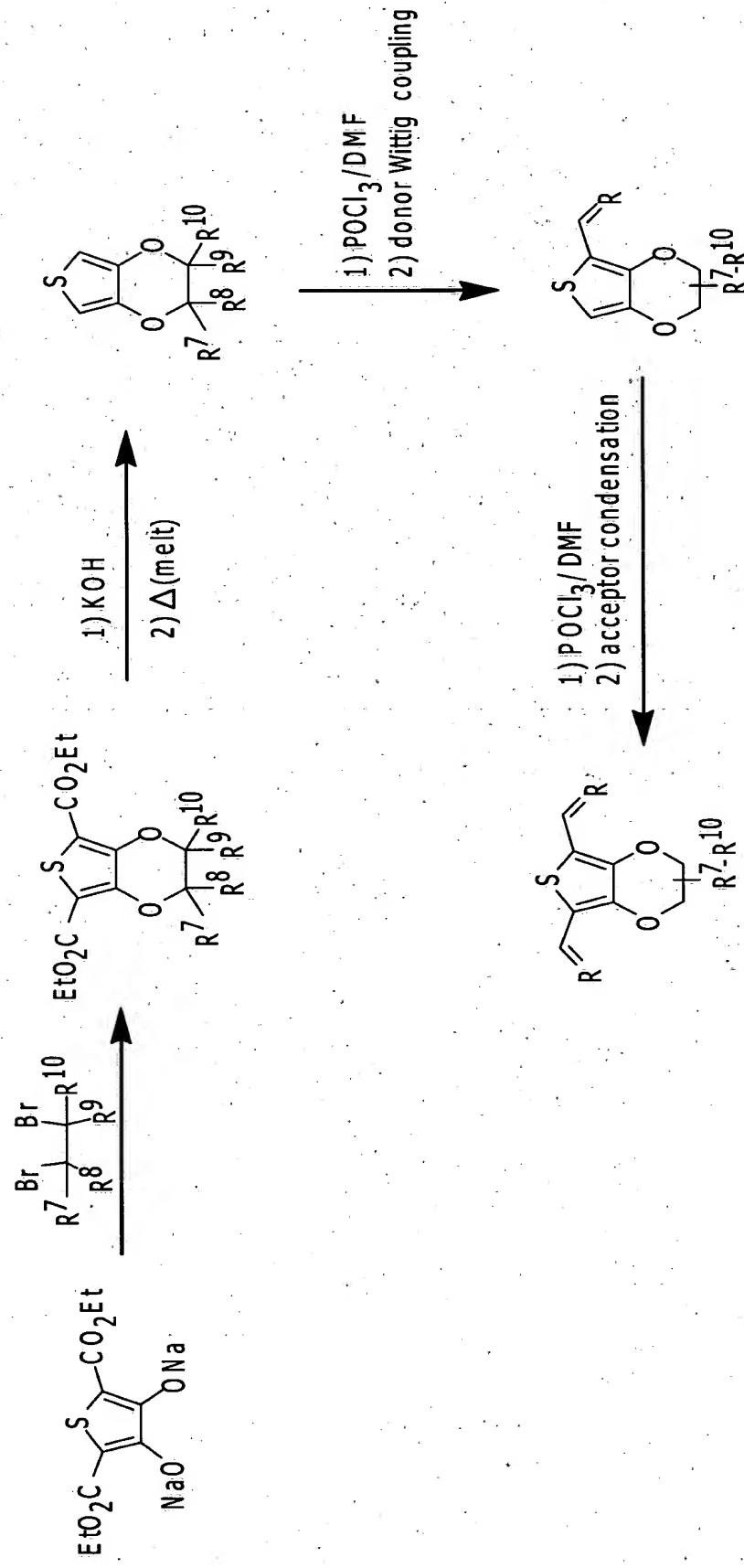


Fig. 6.

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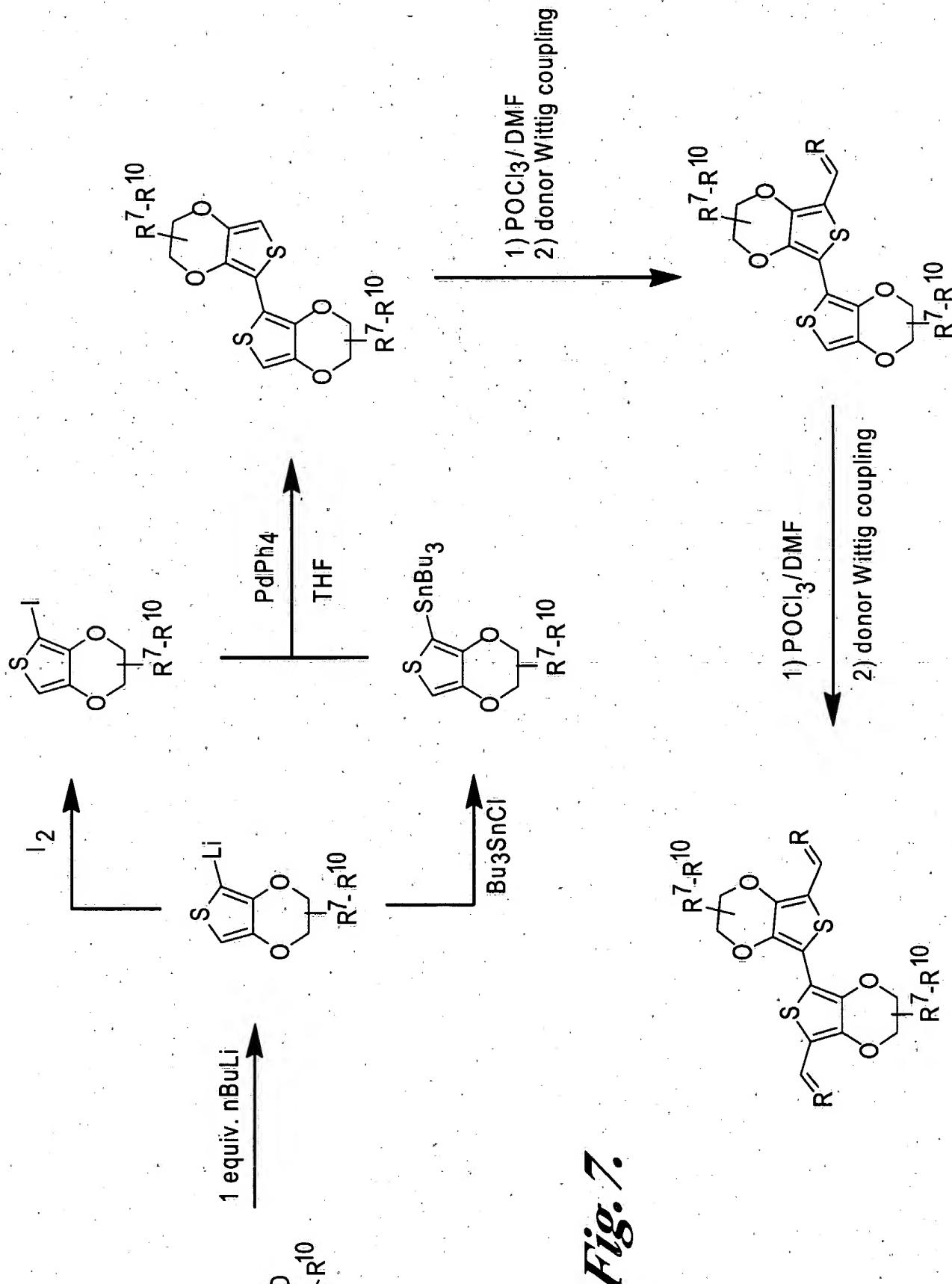


Fig. 7.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
Docket No.: UOFW117403

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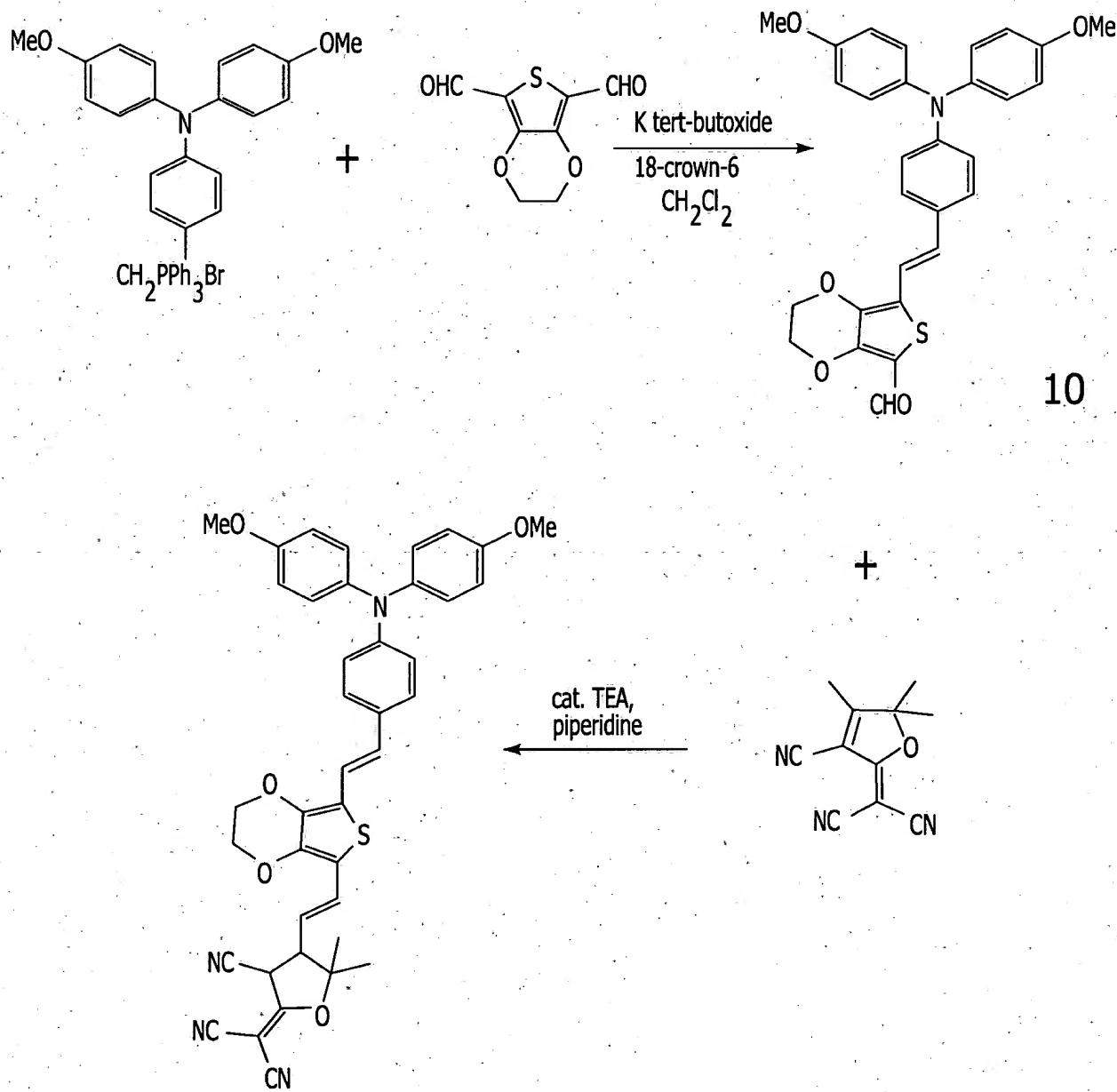


Fig. 8.

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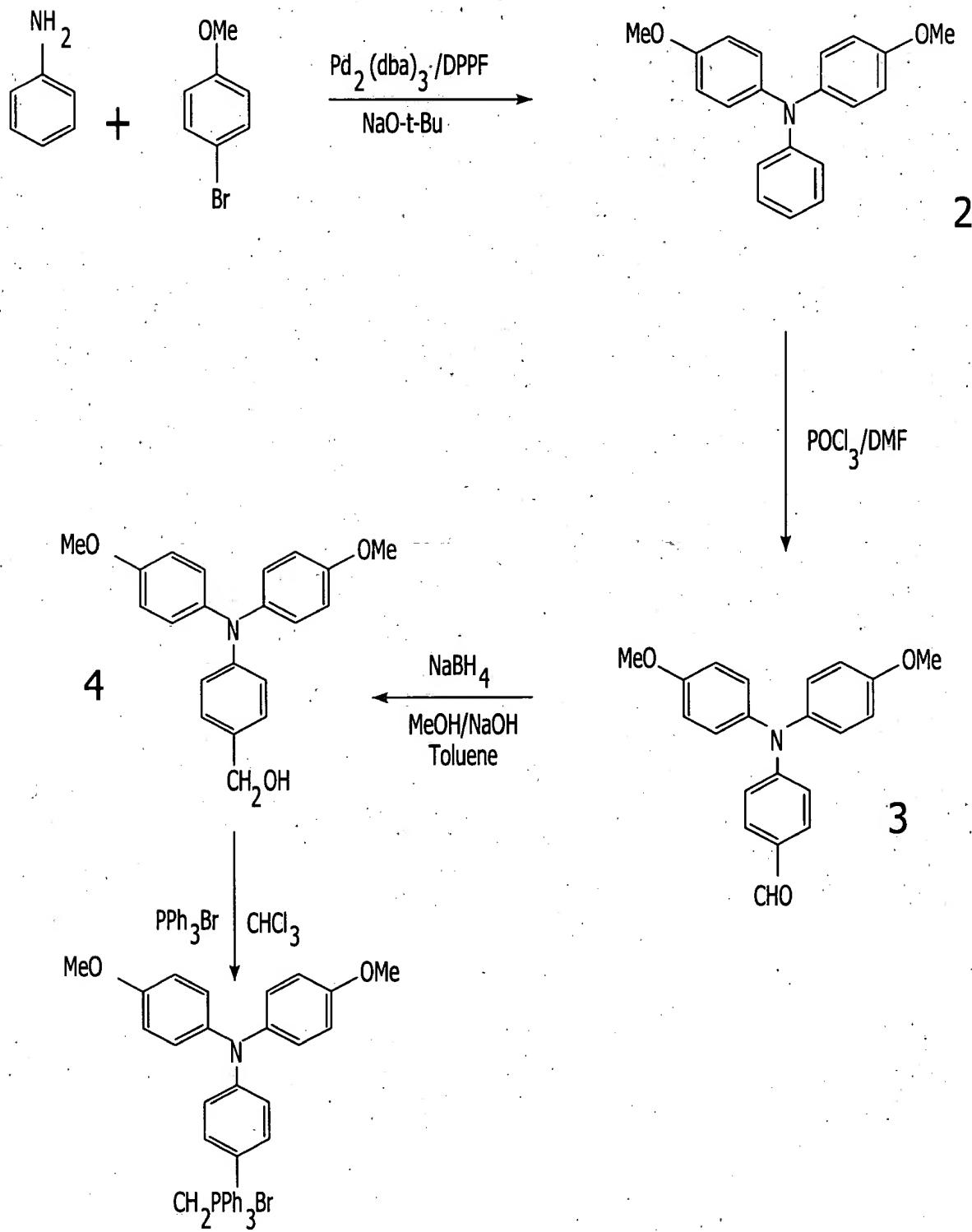


Fig. 9

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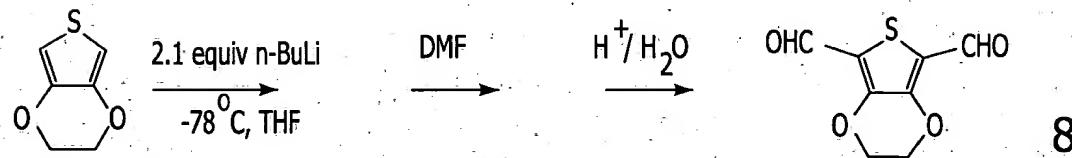


Fig.10.

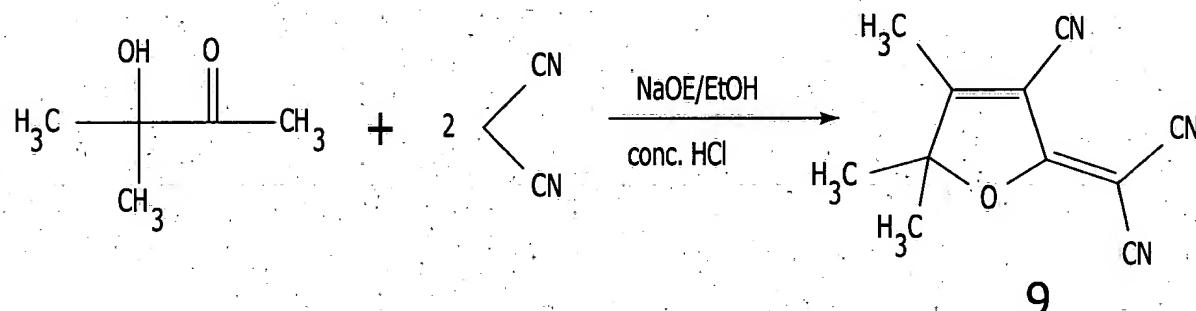


Fig.11.

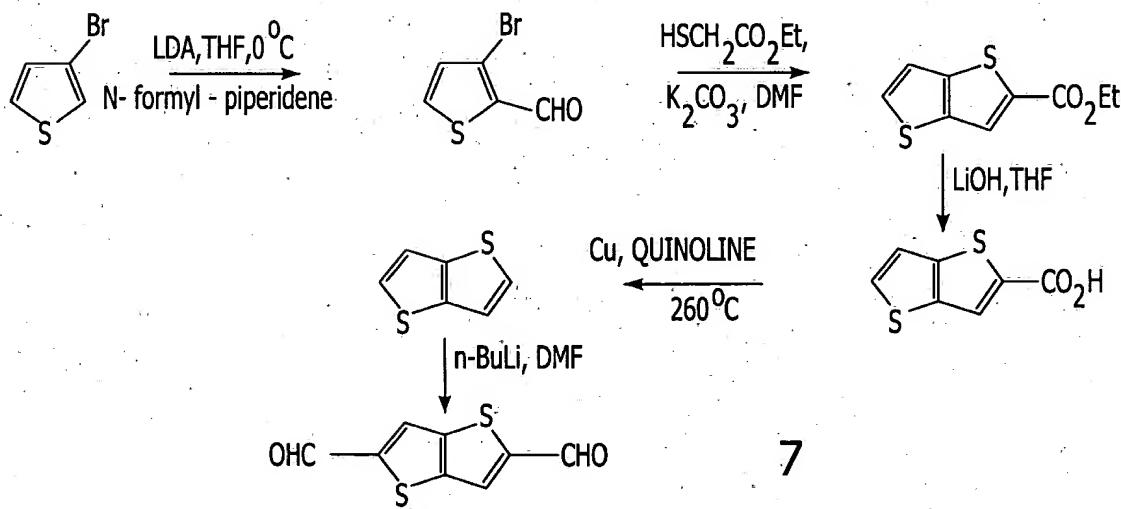


Fig.13.

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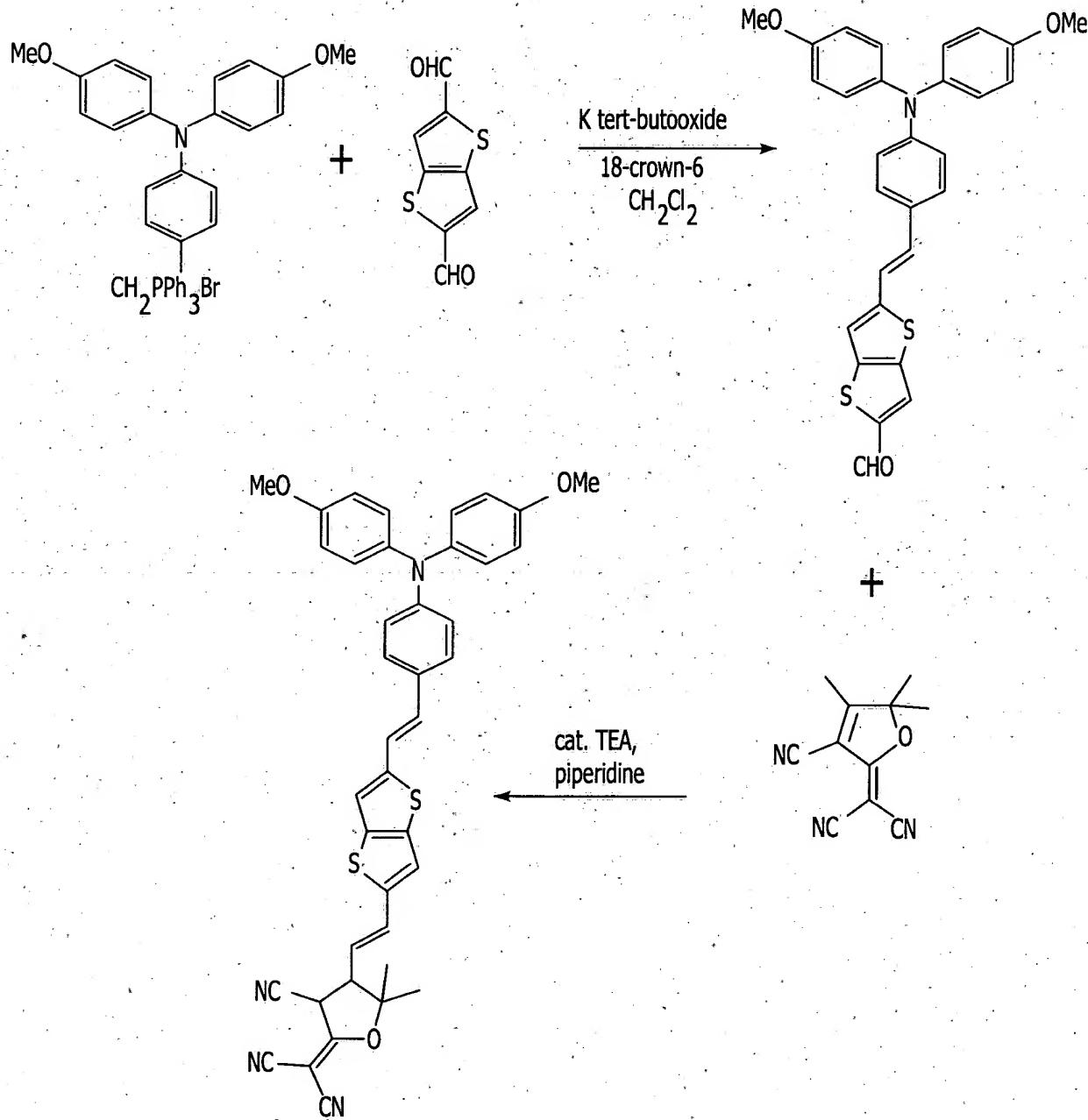


Fig. 12.

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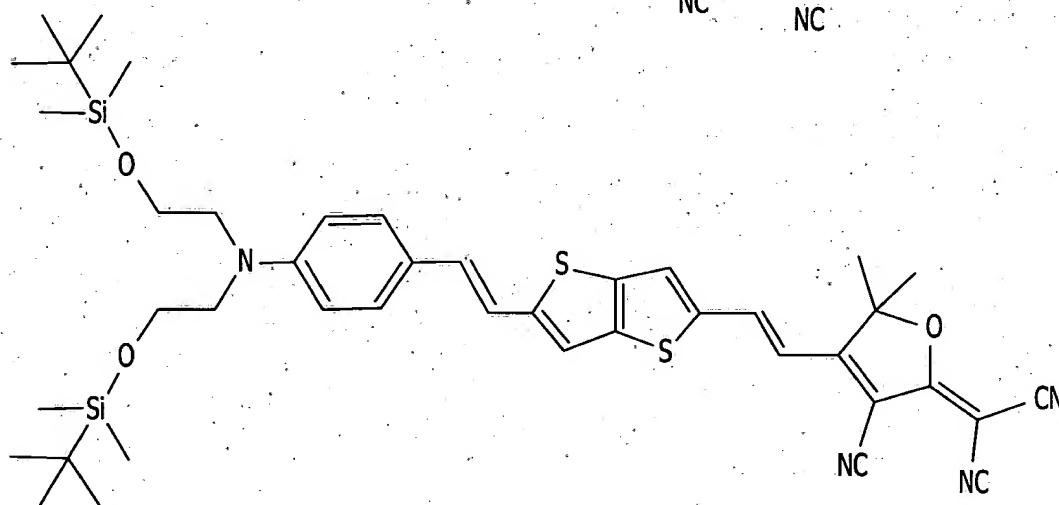
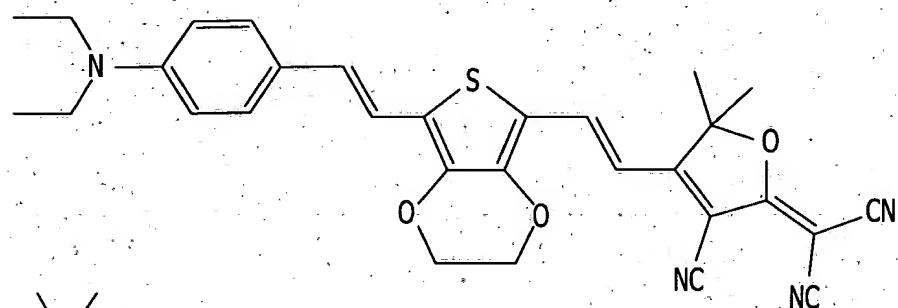
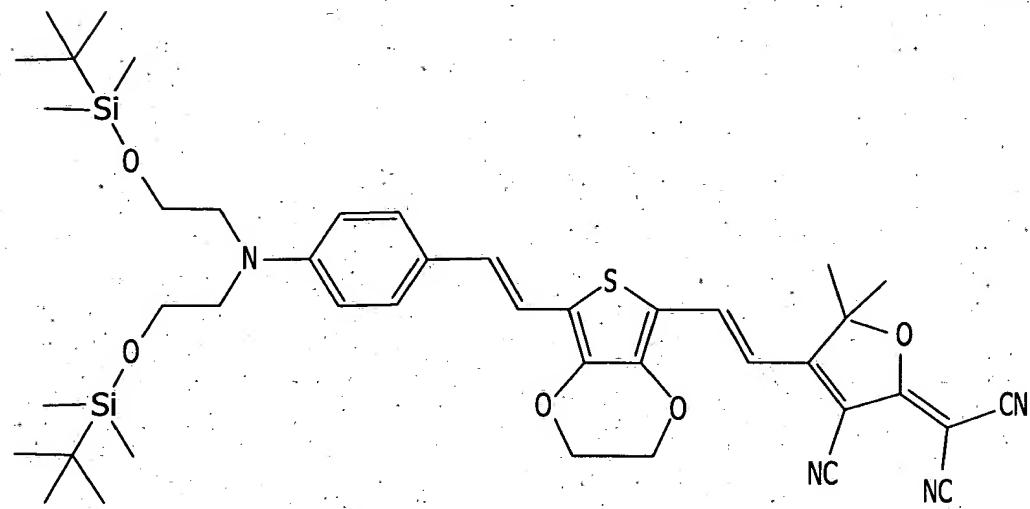


Fig. 14.

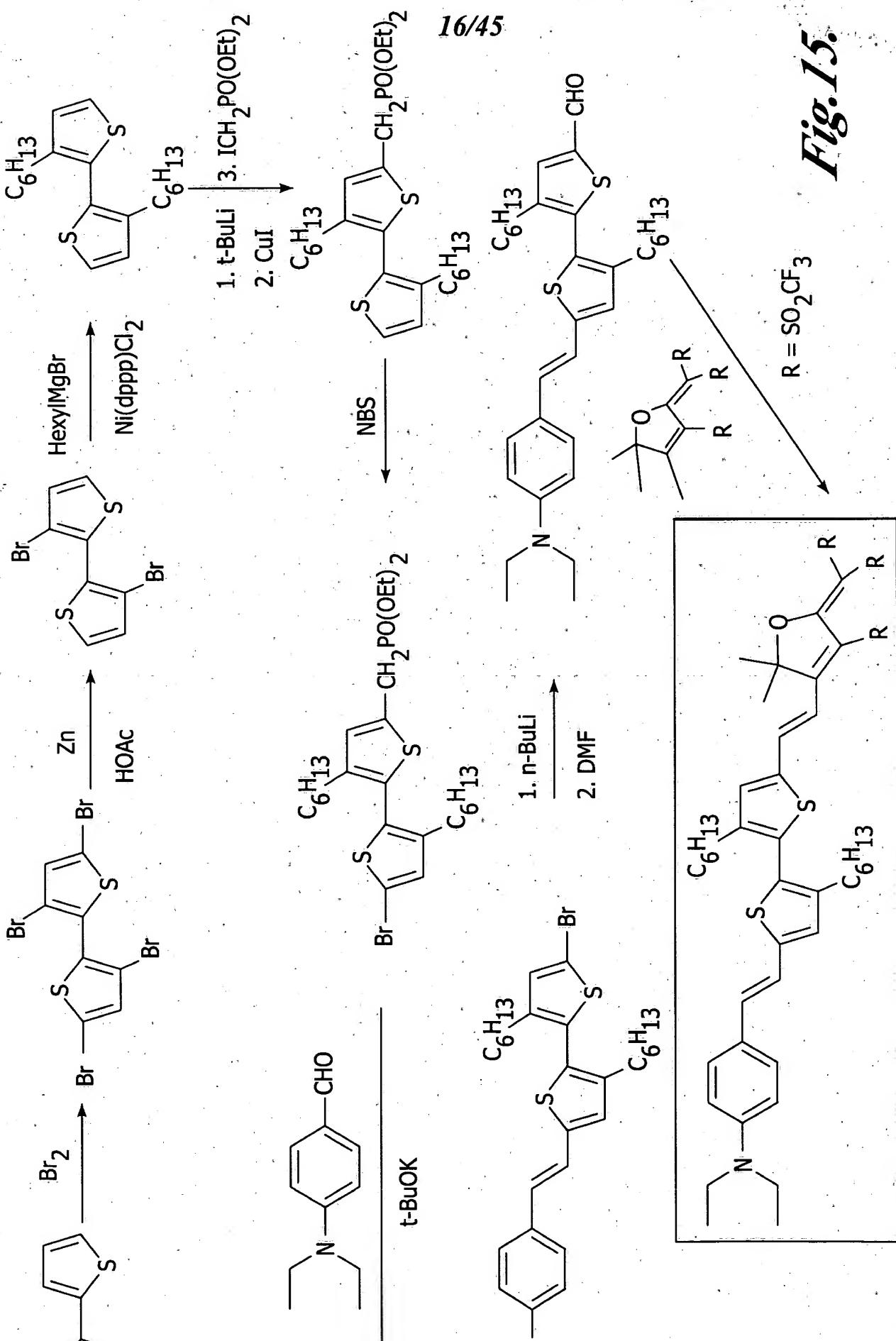


Fig. 15.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
 Inventors: L.R. Dalton et al.  
 Application No.: 09/912,444  
 Docket No.: UOFW117403

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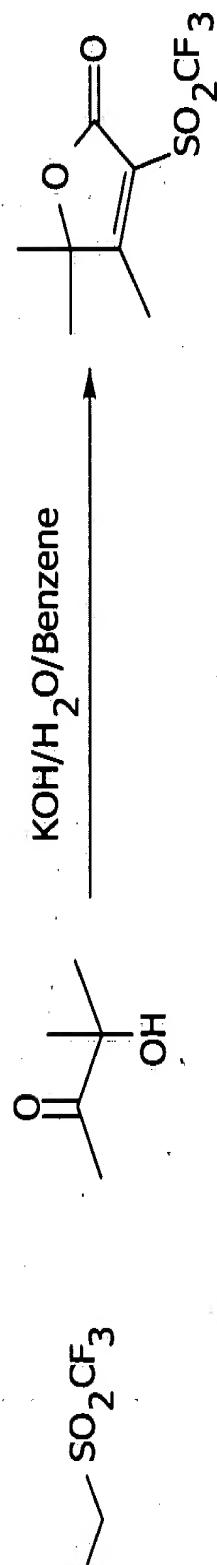


Fig. 16.

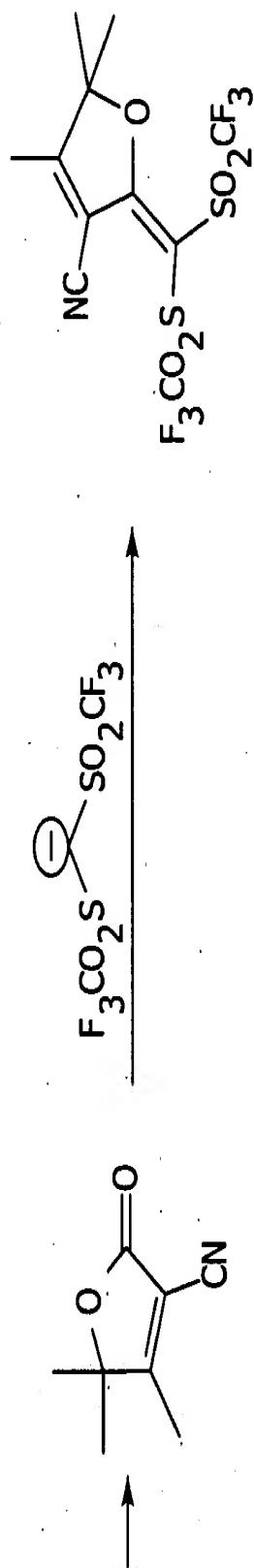


Fig. 19.

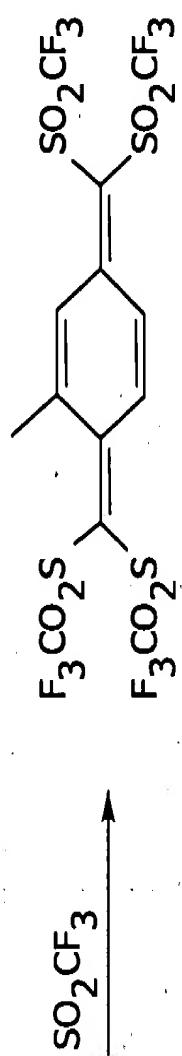


Fig. 20.

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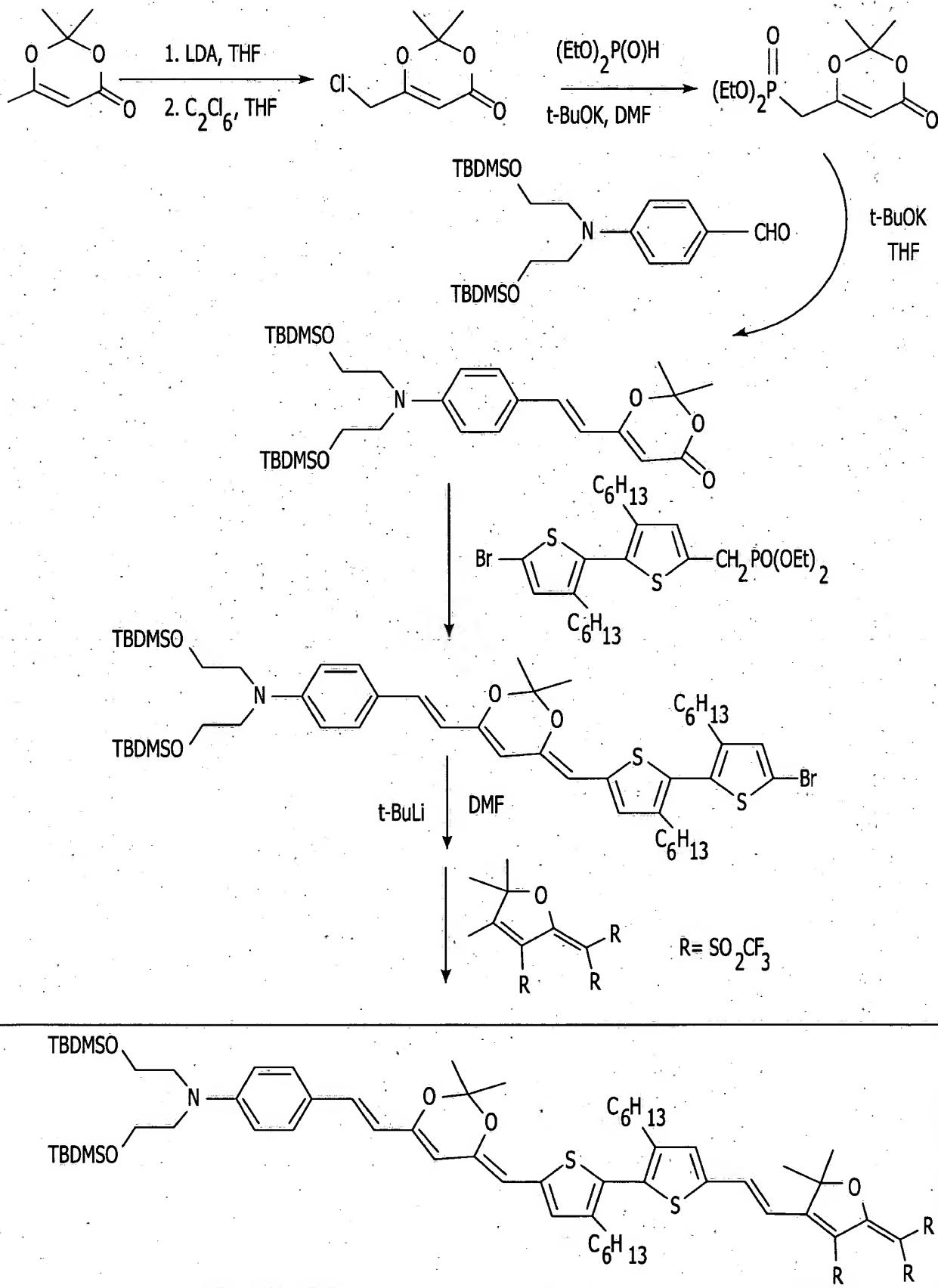


Fig. 17.

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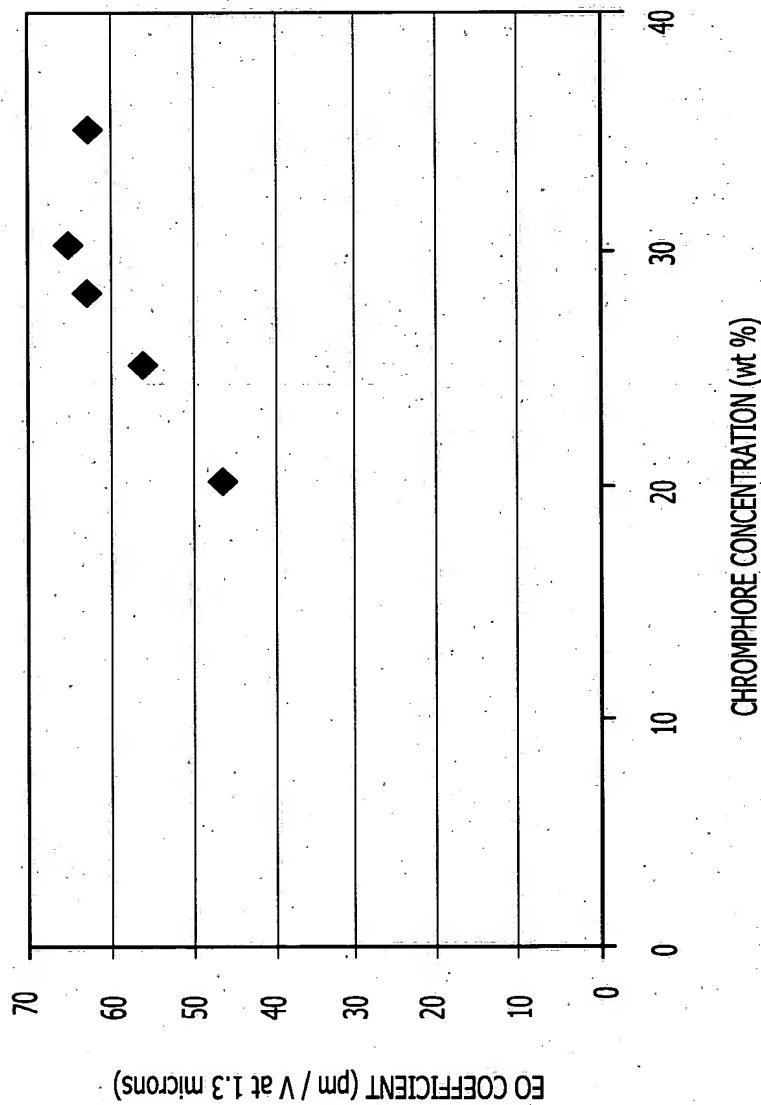


Fig. 18.

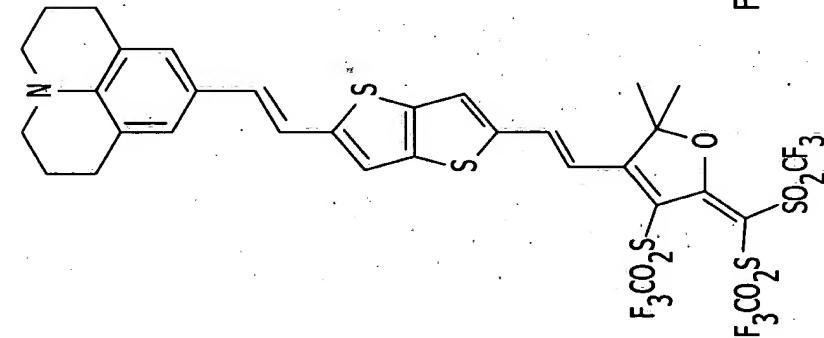
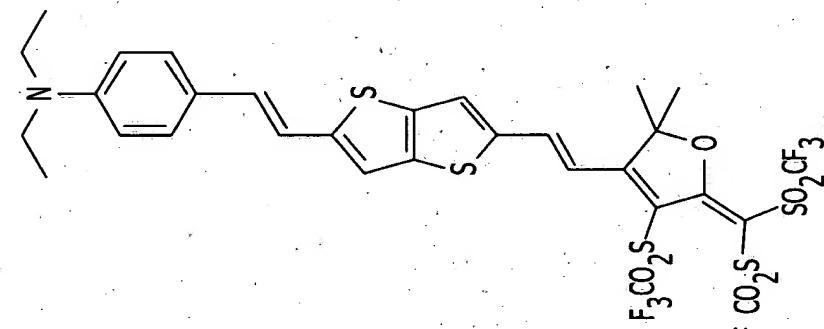
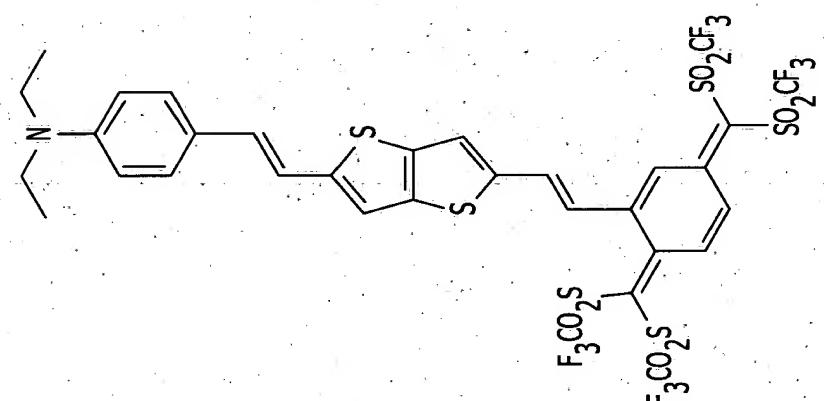
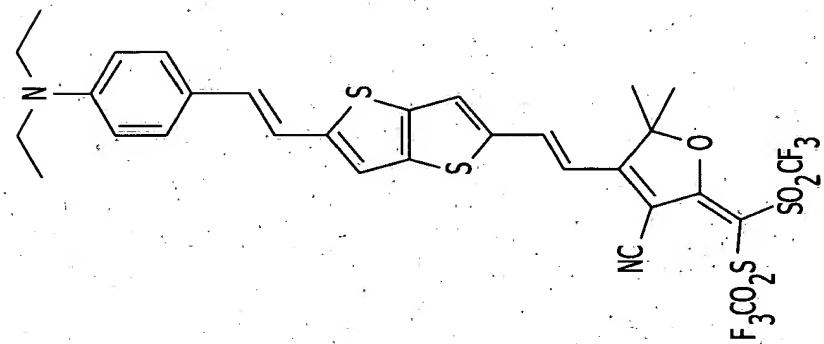


Fig. 21.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
Docket No.: UOFW117403

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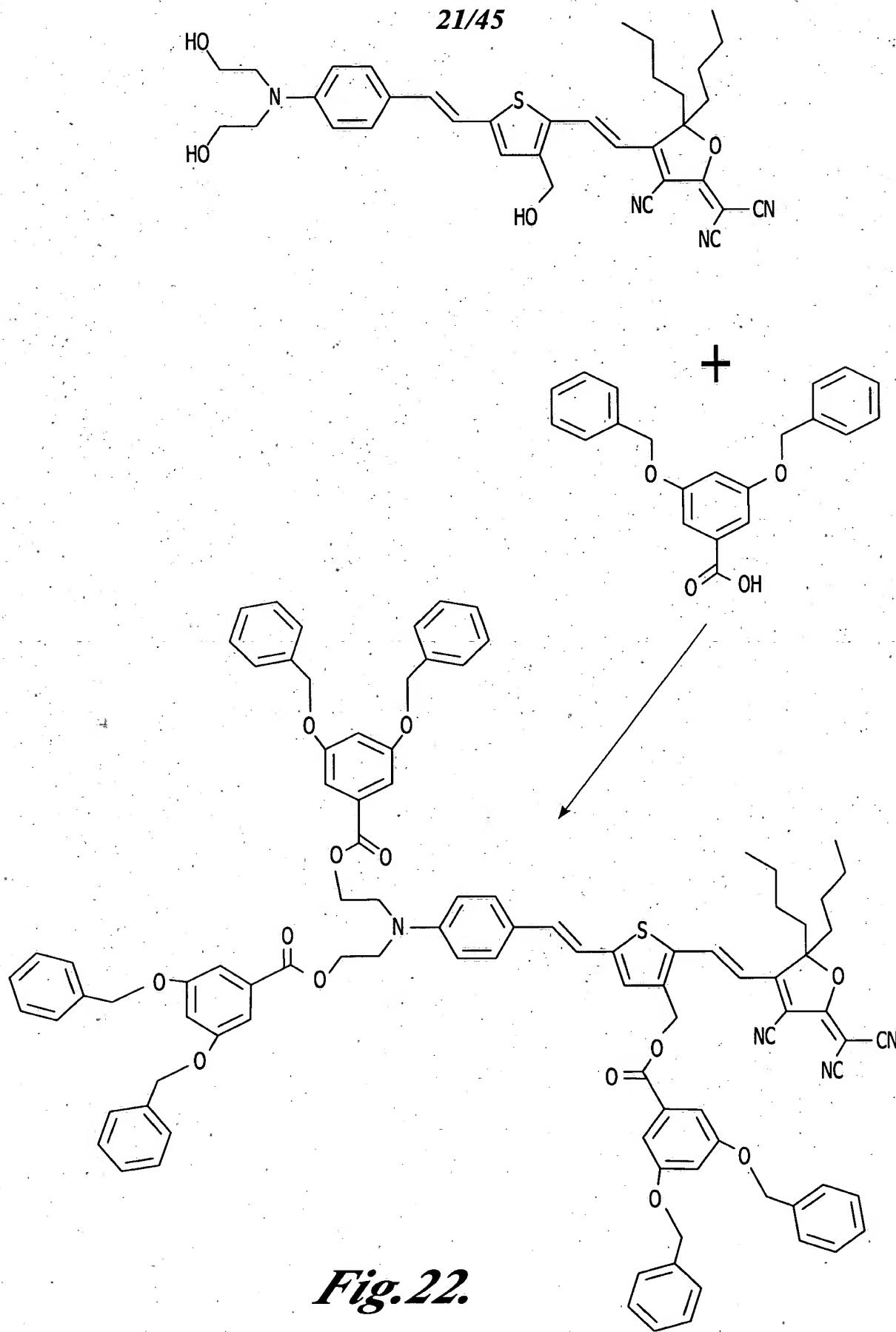
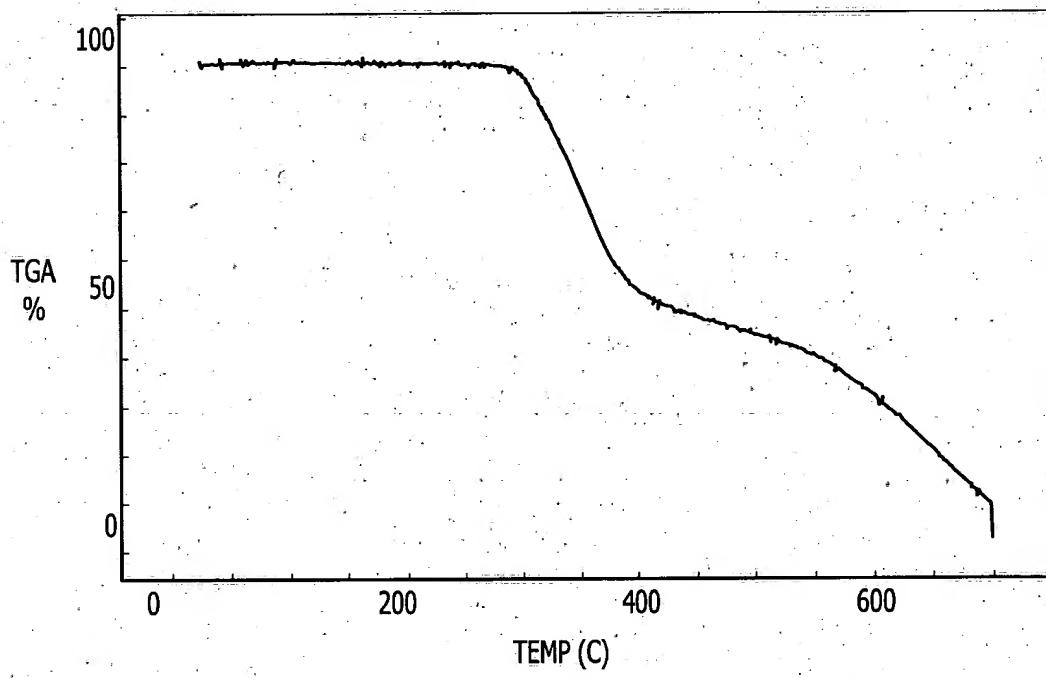


Fig. 22.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
Docket No.: UOFW117403

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*Fig. 23.*

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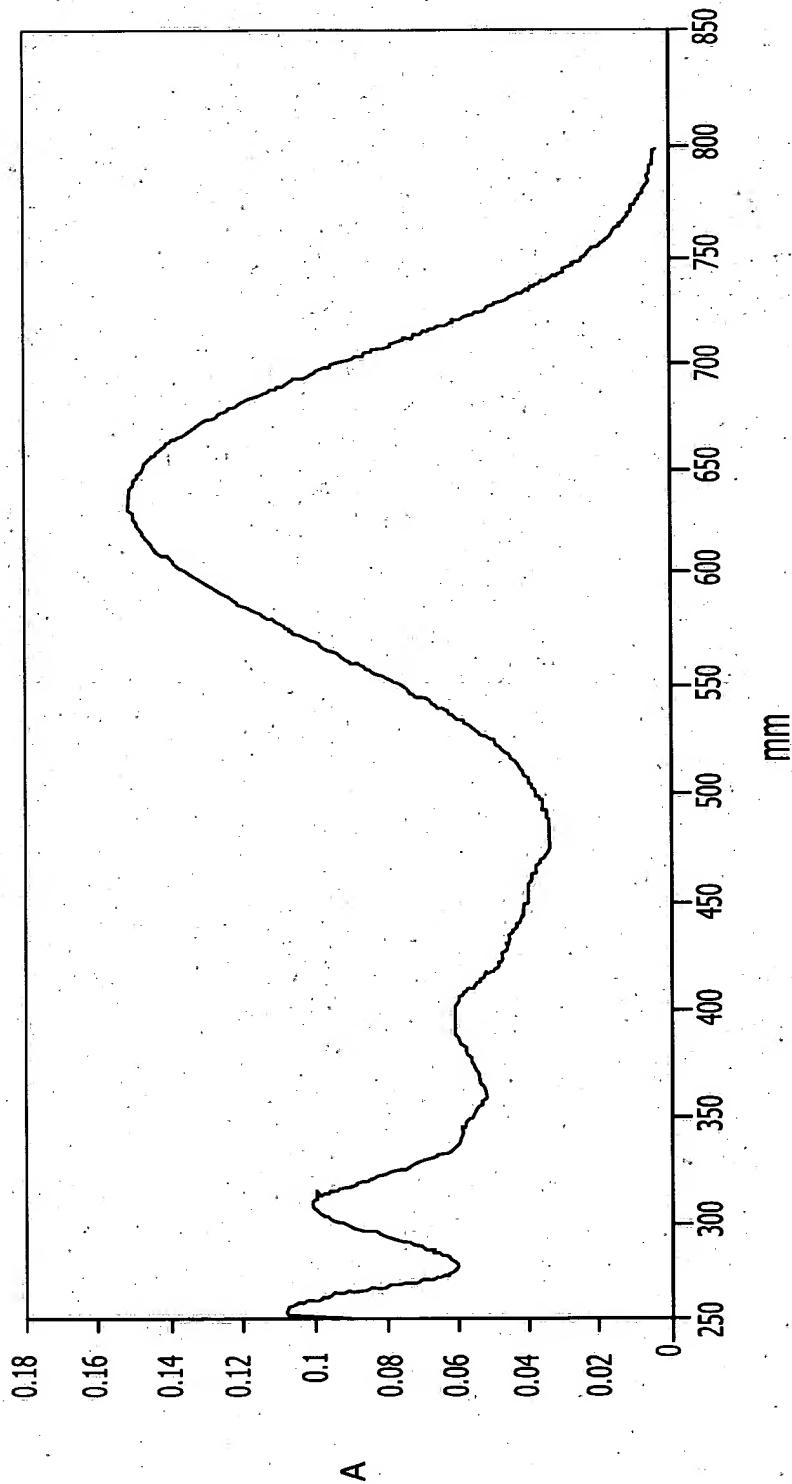


Fig. 24.

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
Docket No.: UO FW 117403

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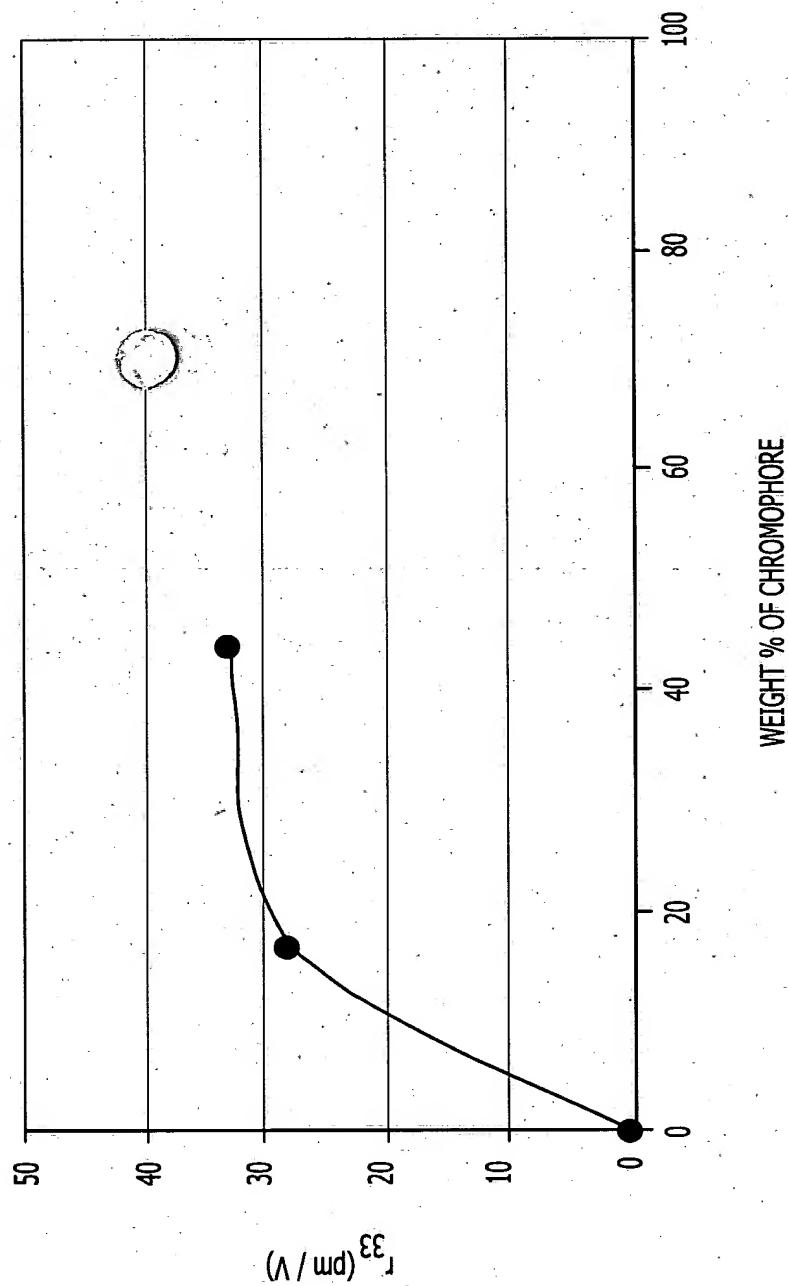


Fig. 25.

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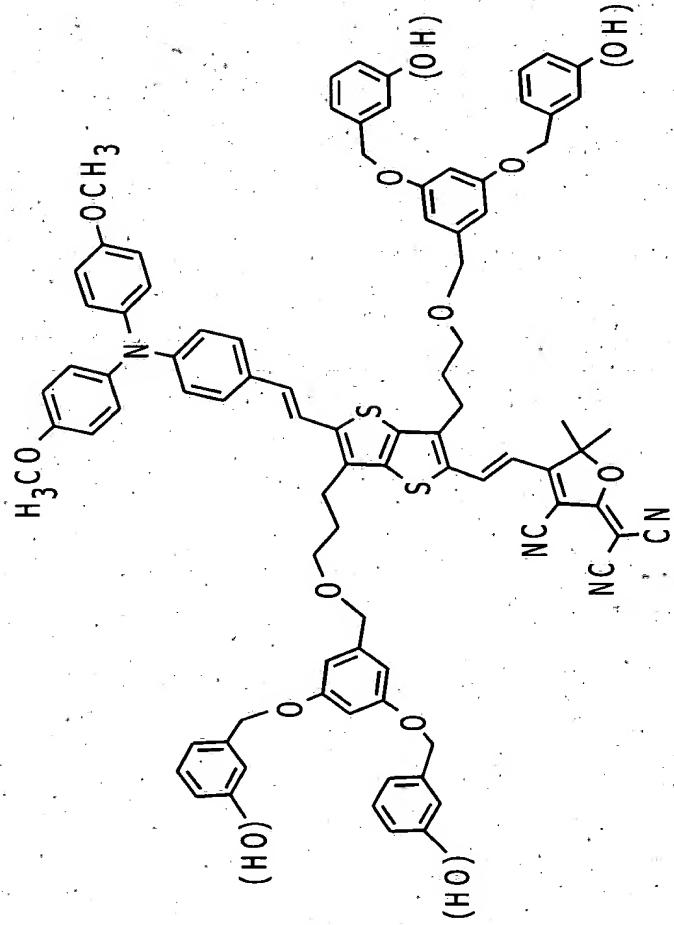
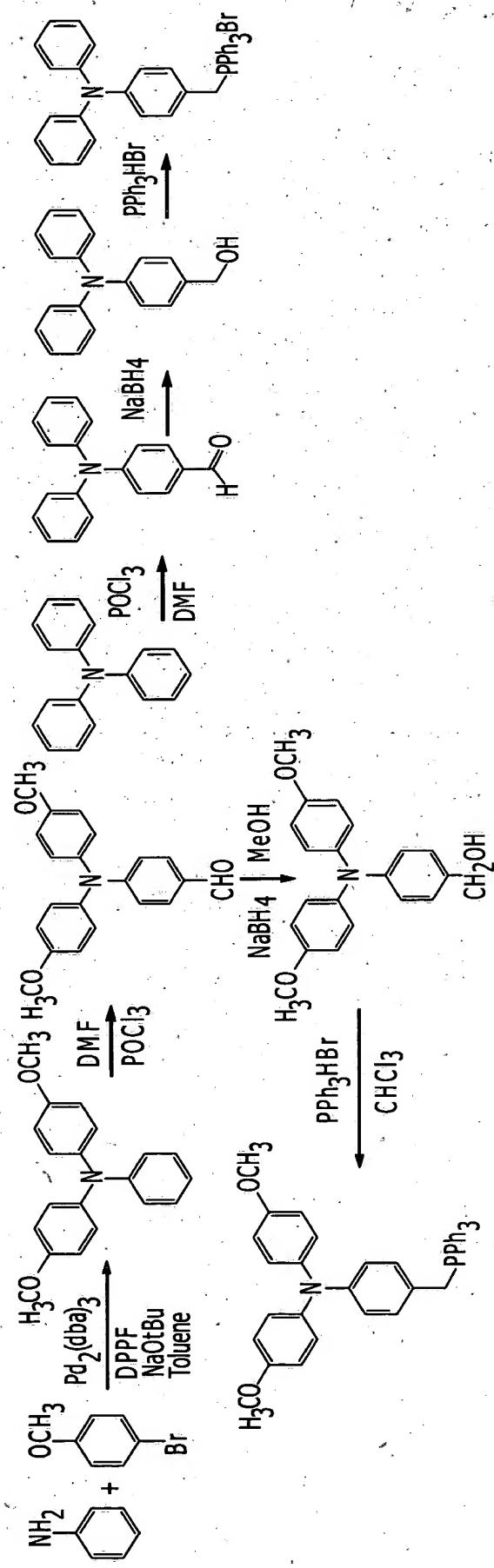


Fig. 26.



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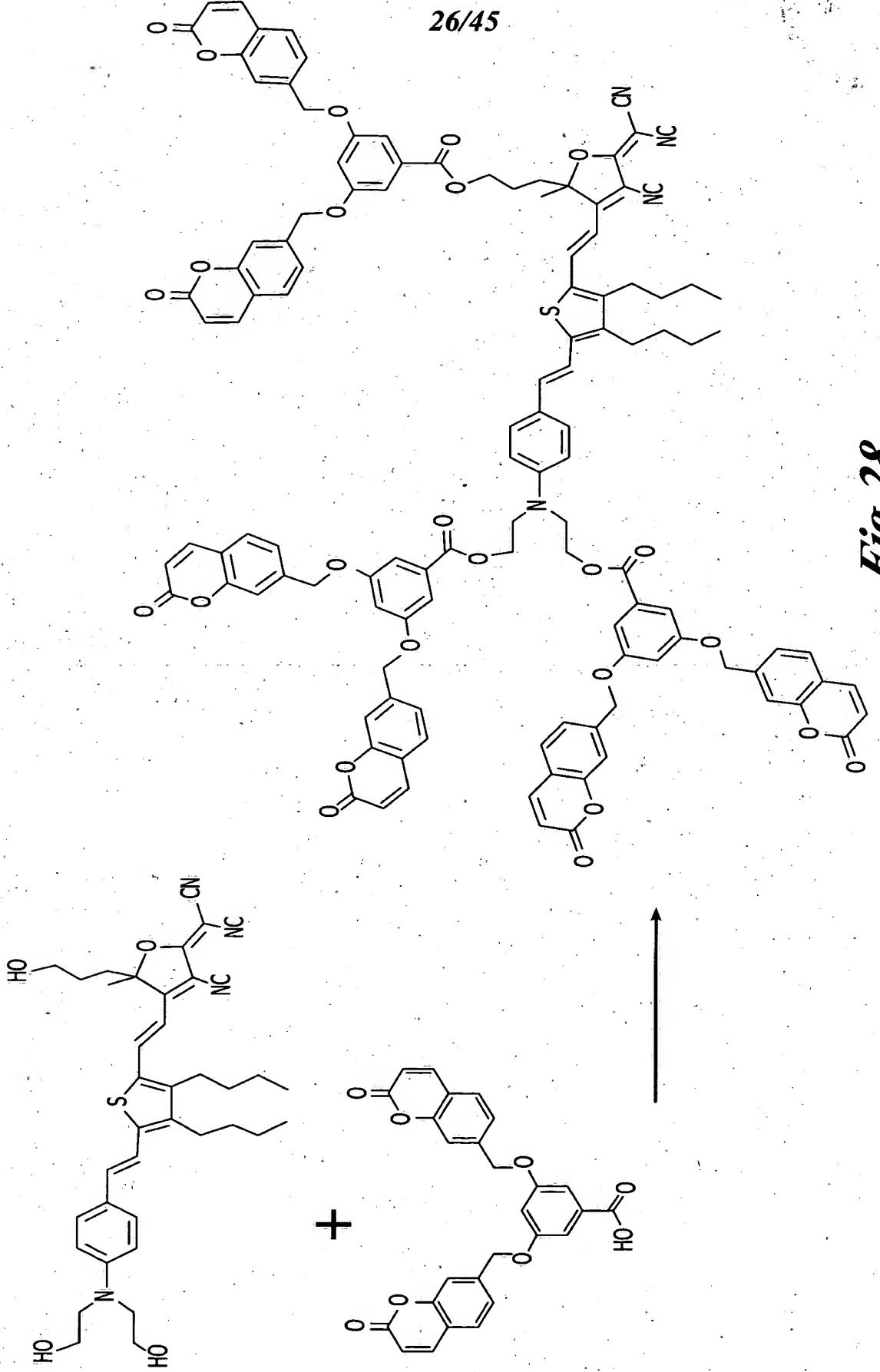


Fig. 28.

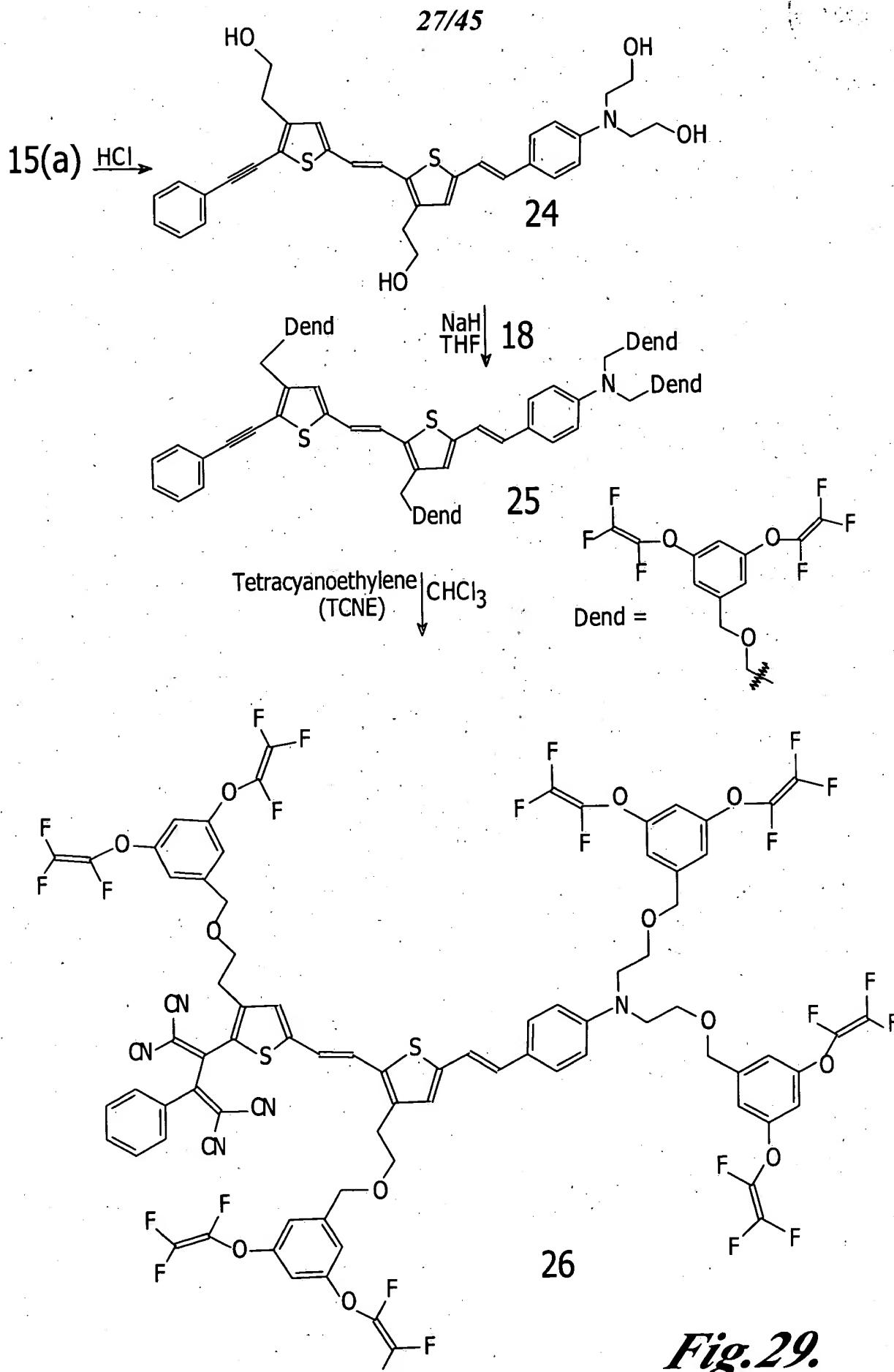


Fig. 29.

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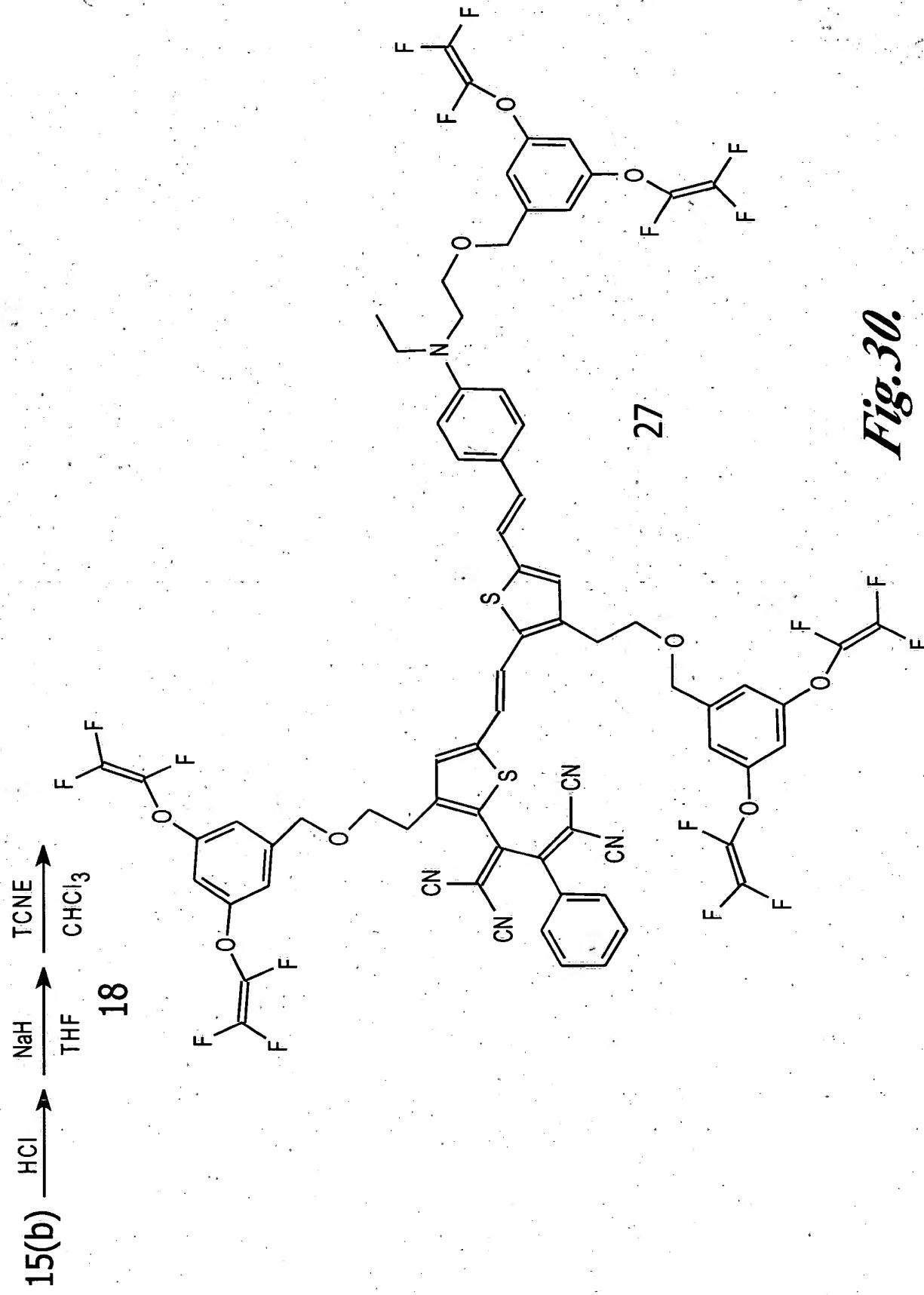
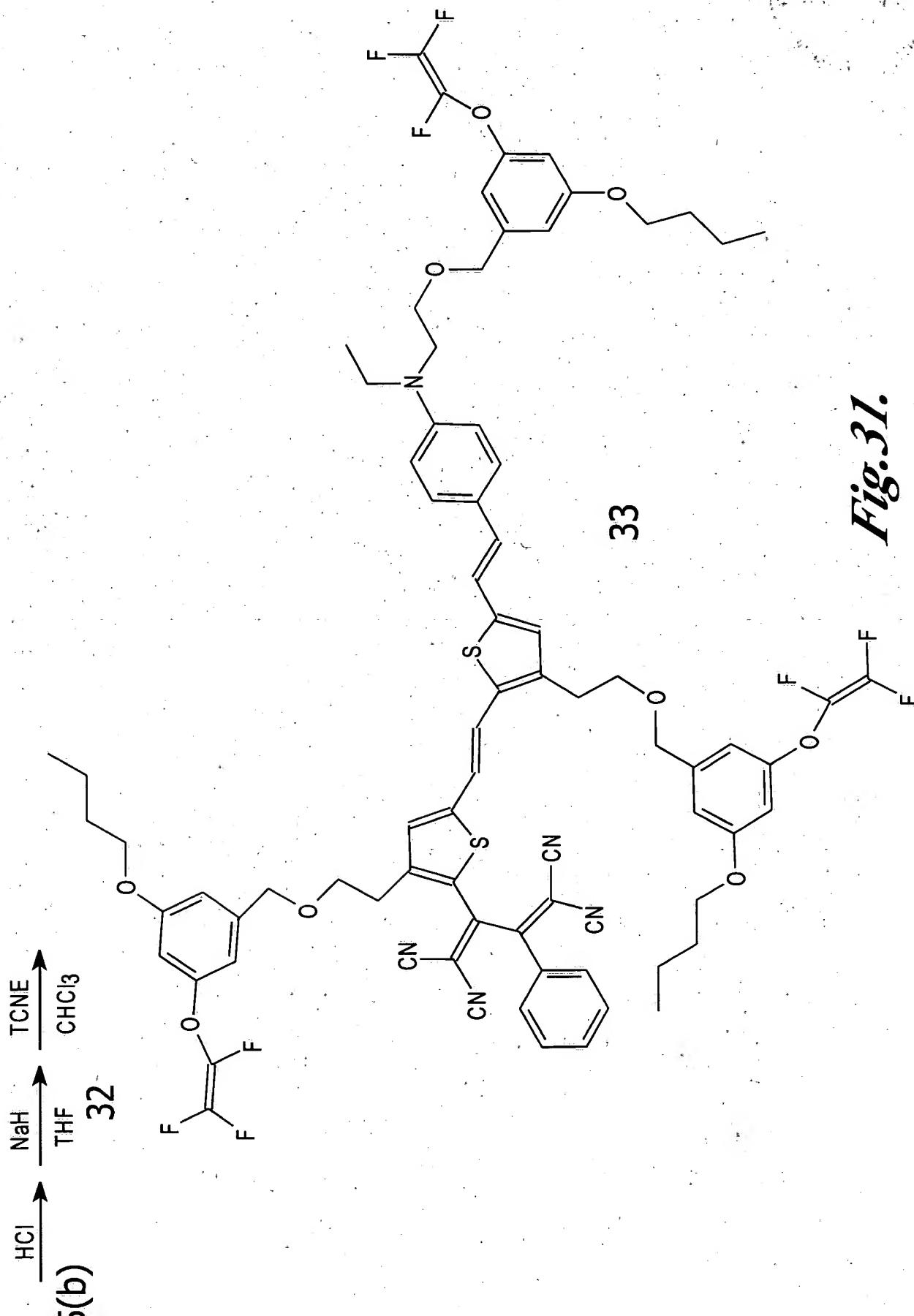
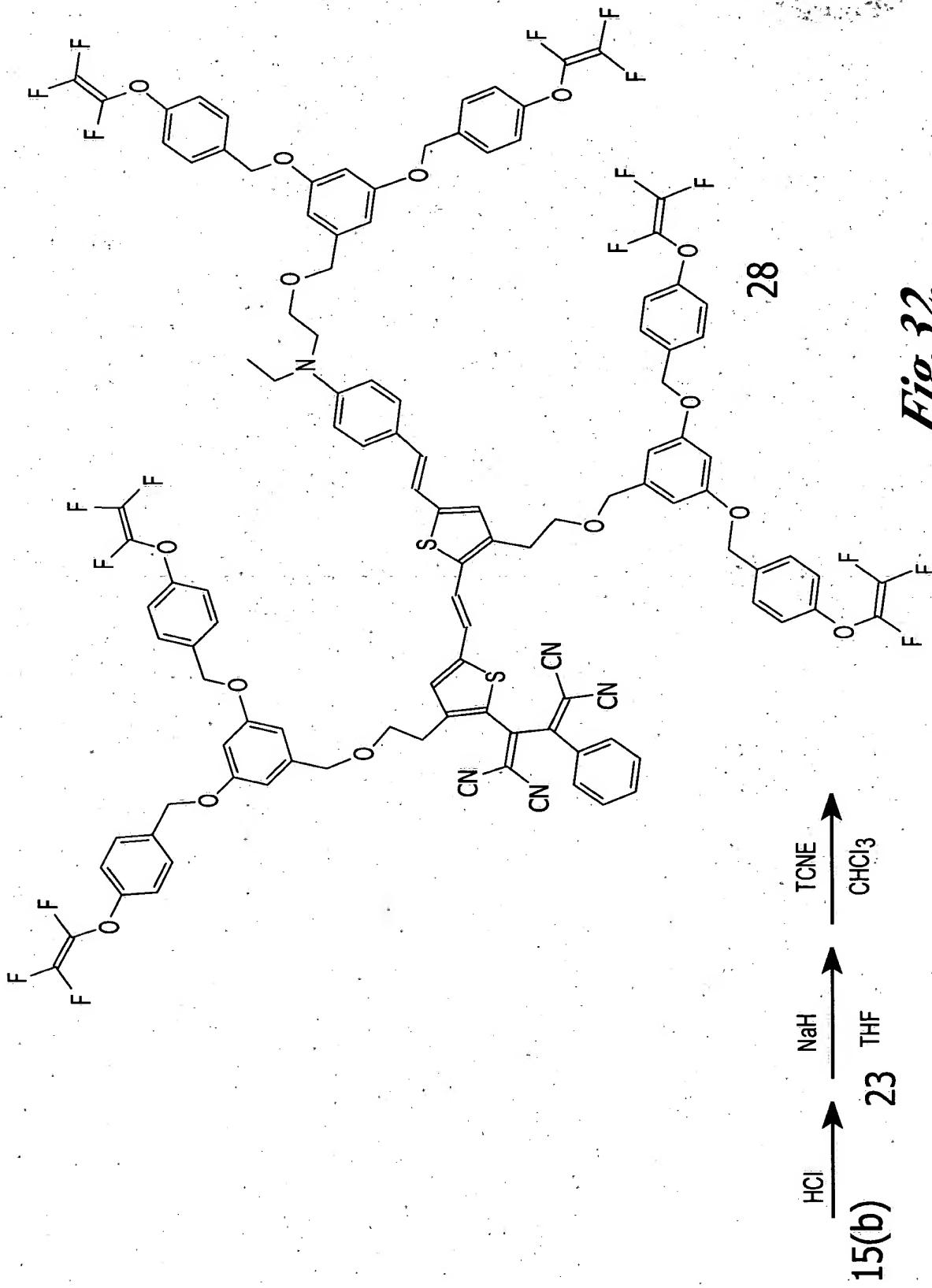


Fig. 30.

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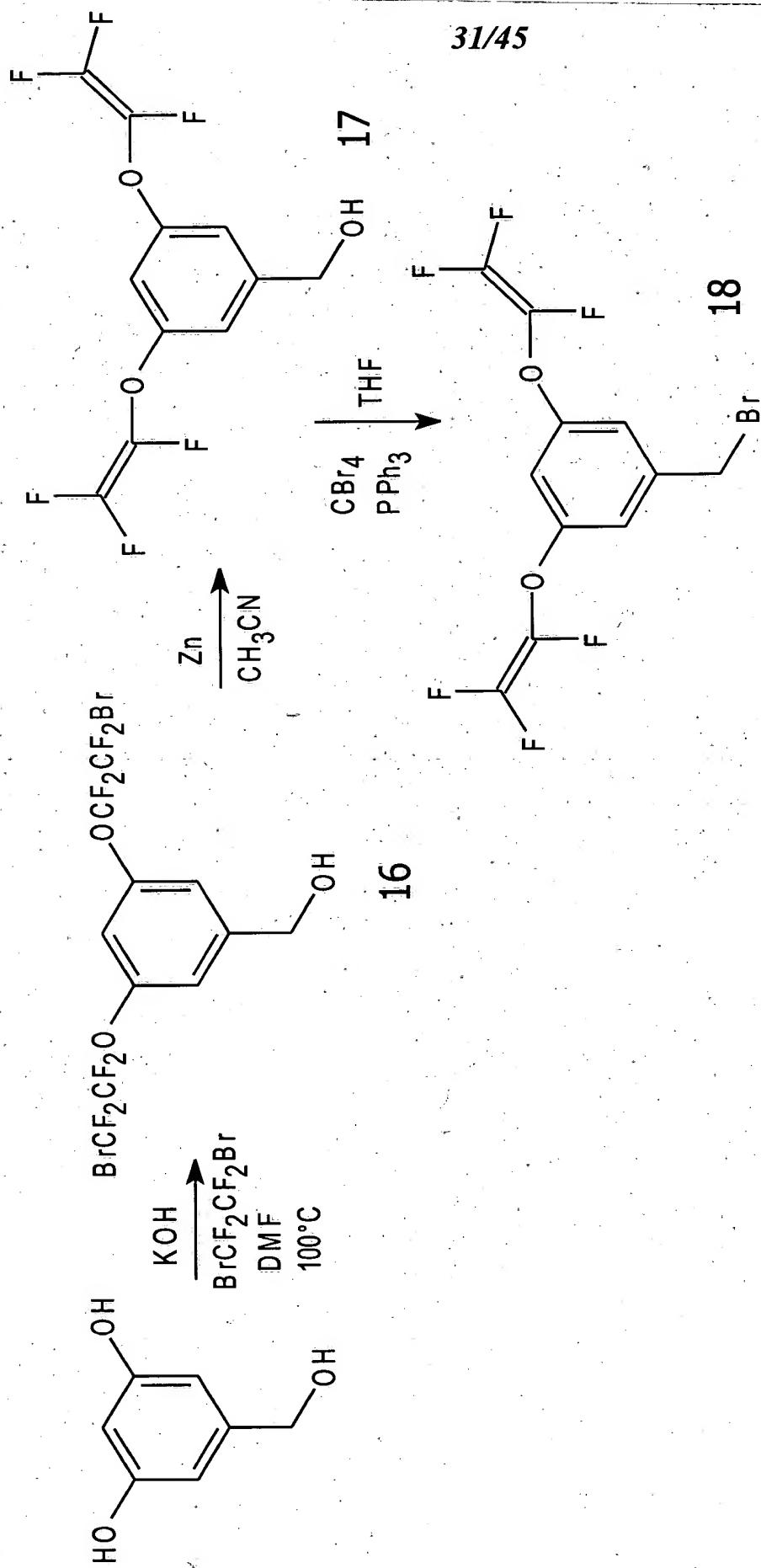


Fig. 33.

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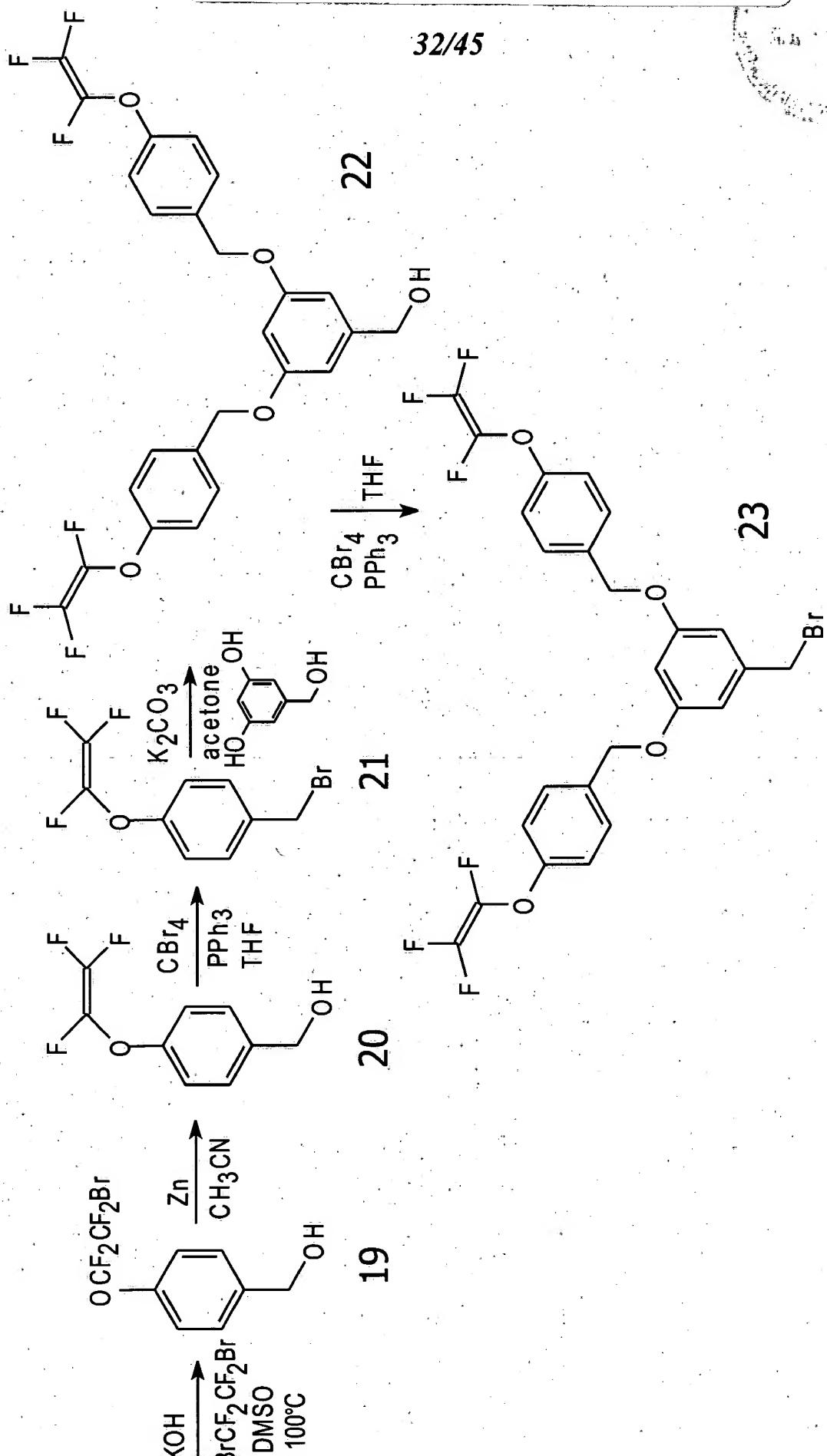


Fig. 34.

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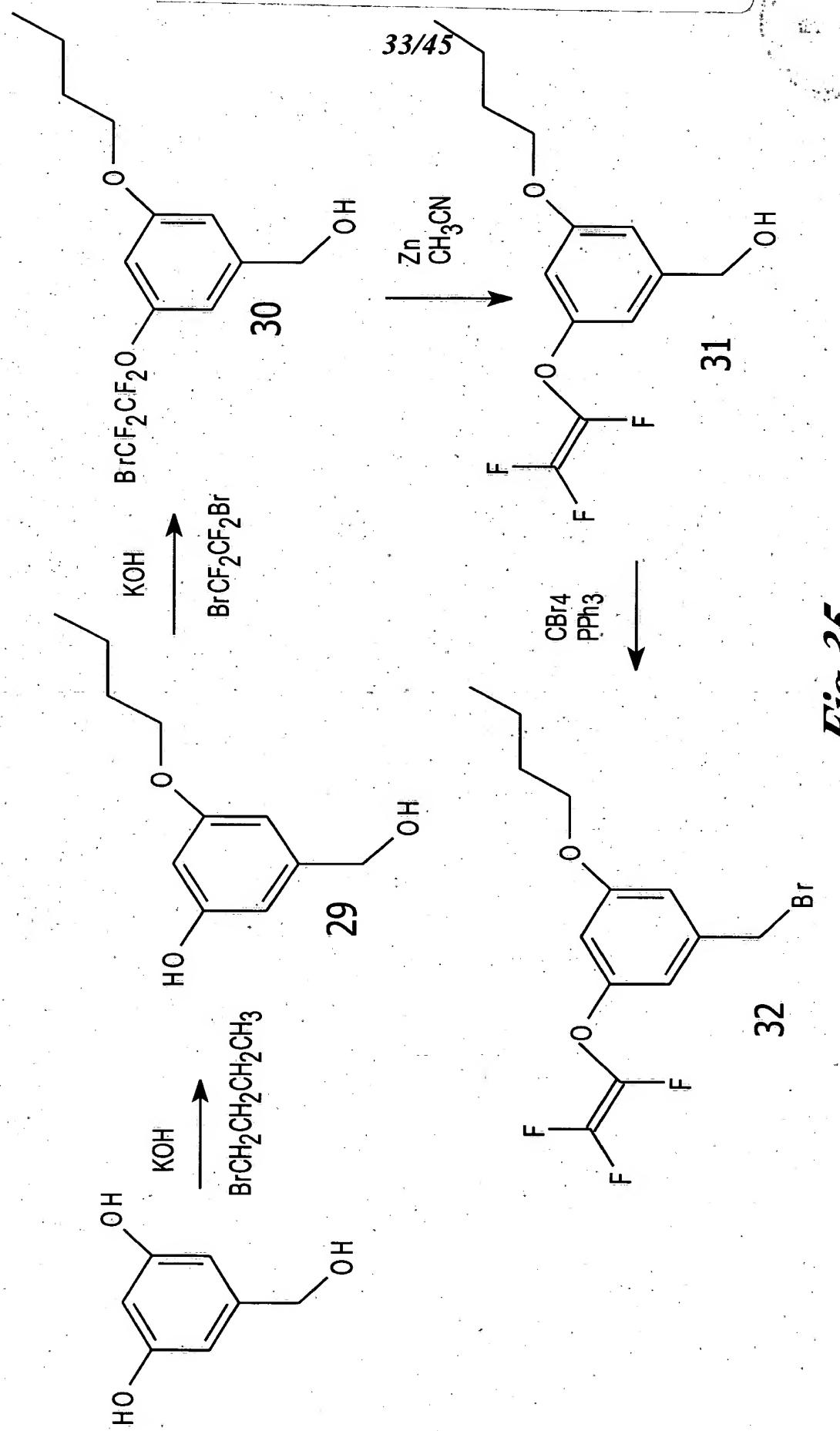
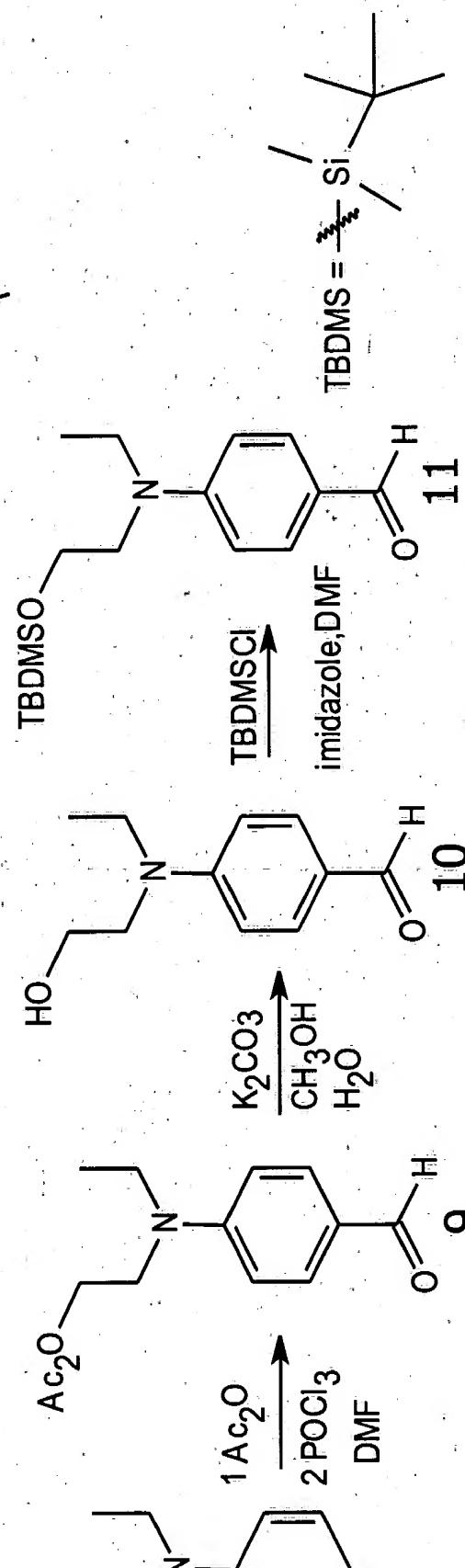
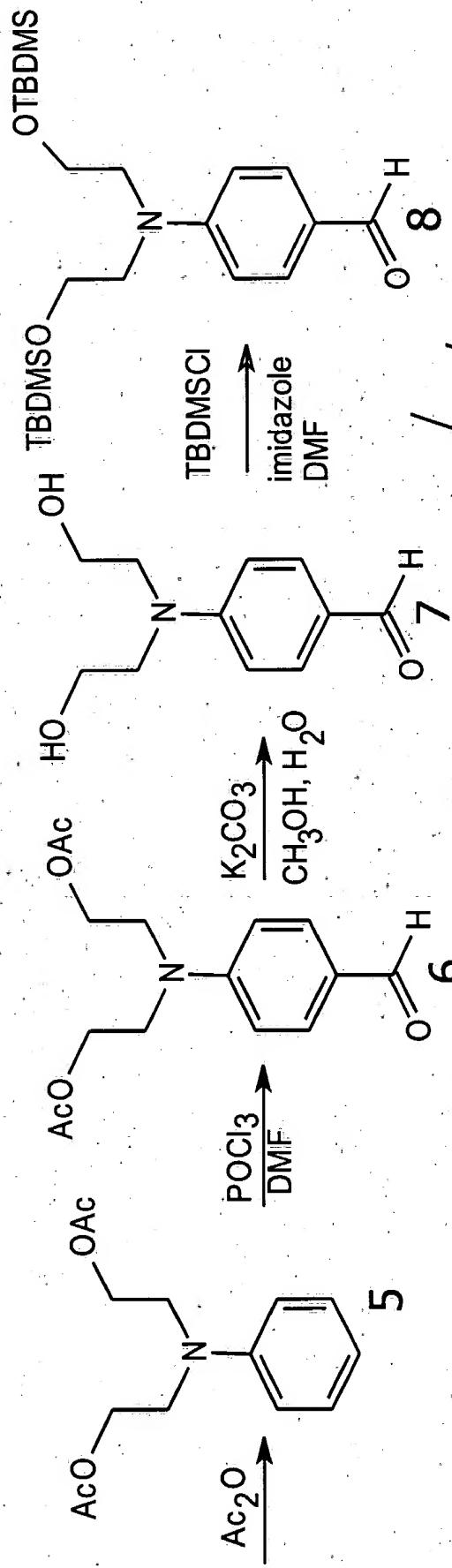


Fig. 35.

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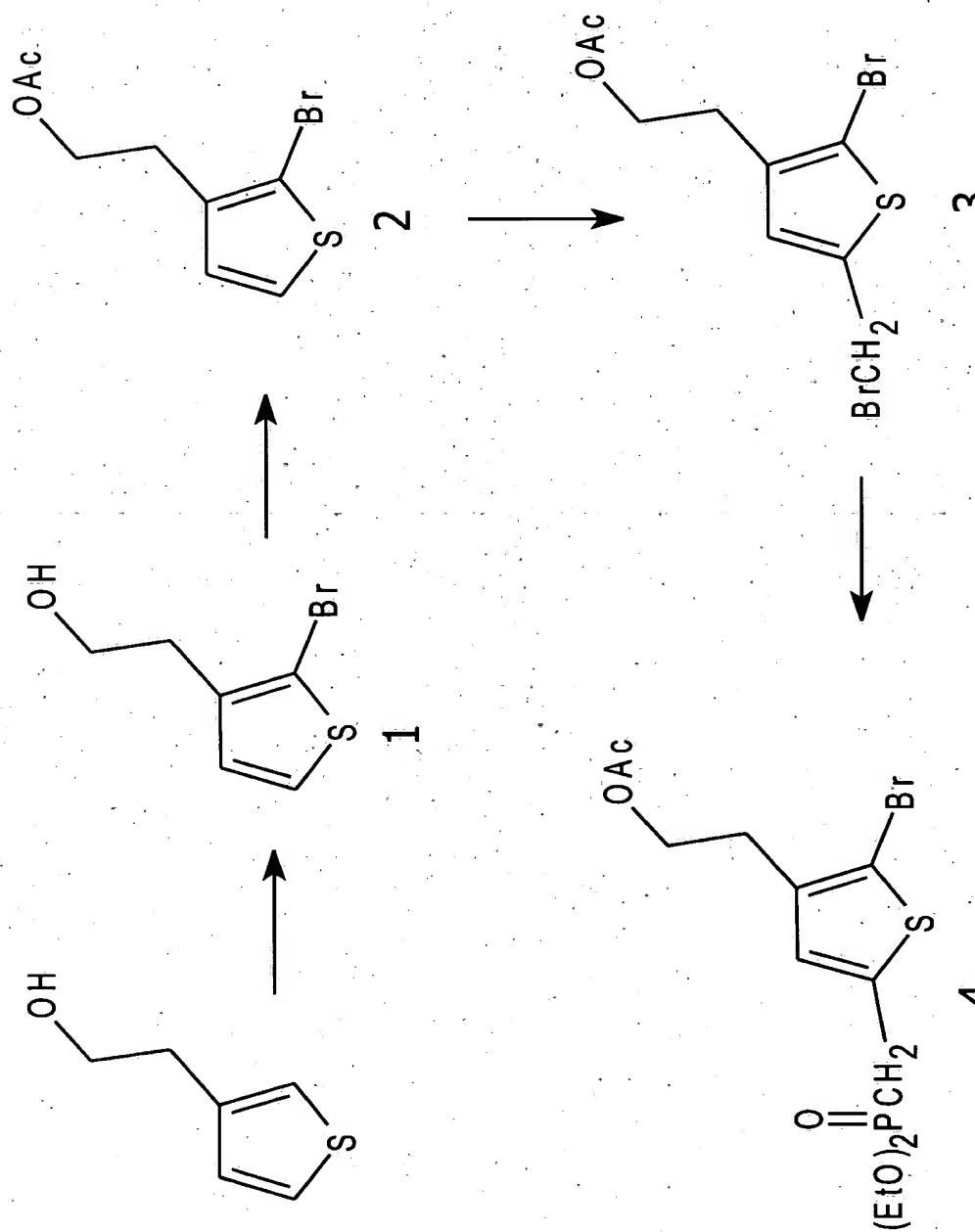


Fig. 38.

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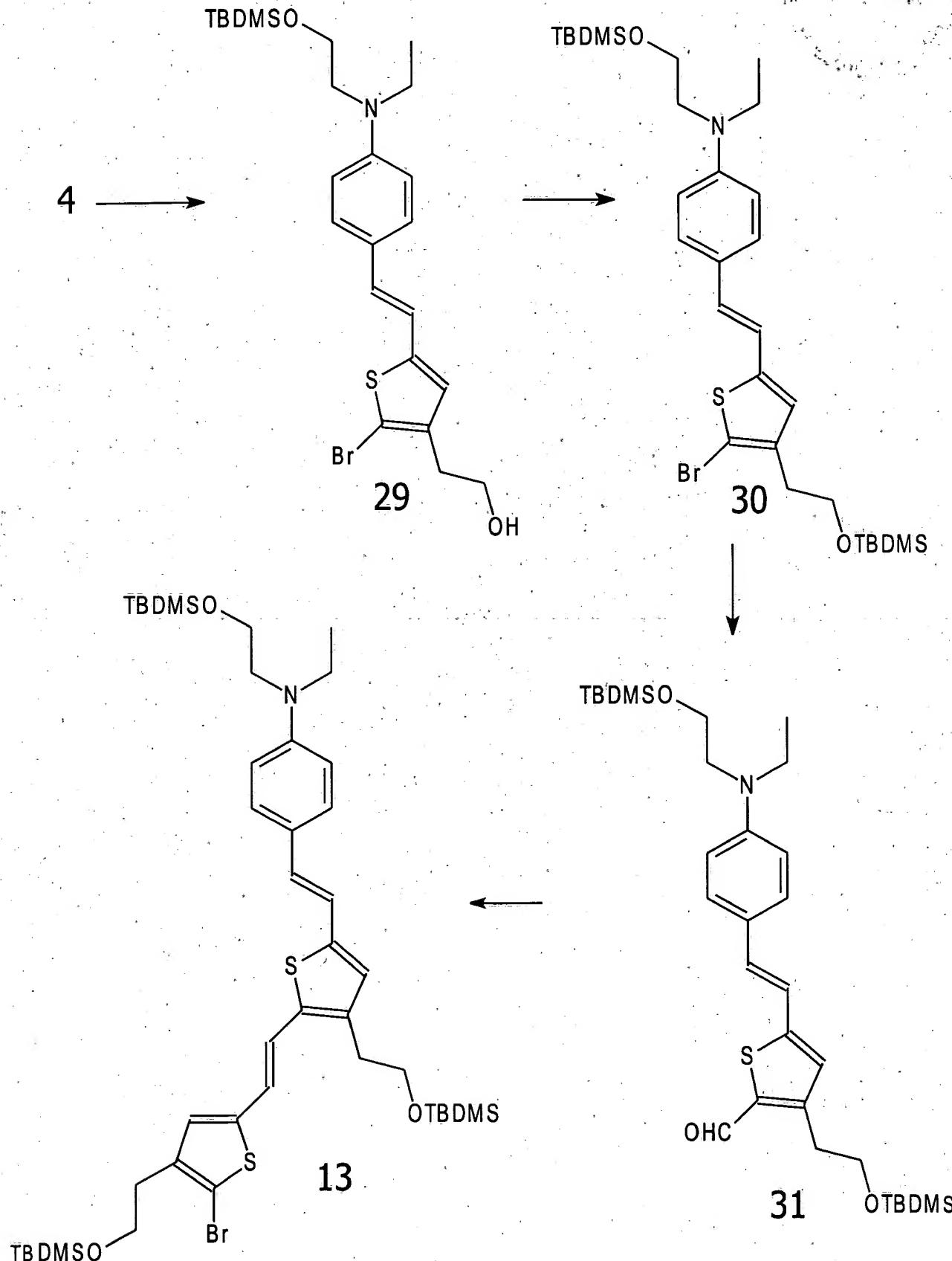
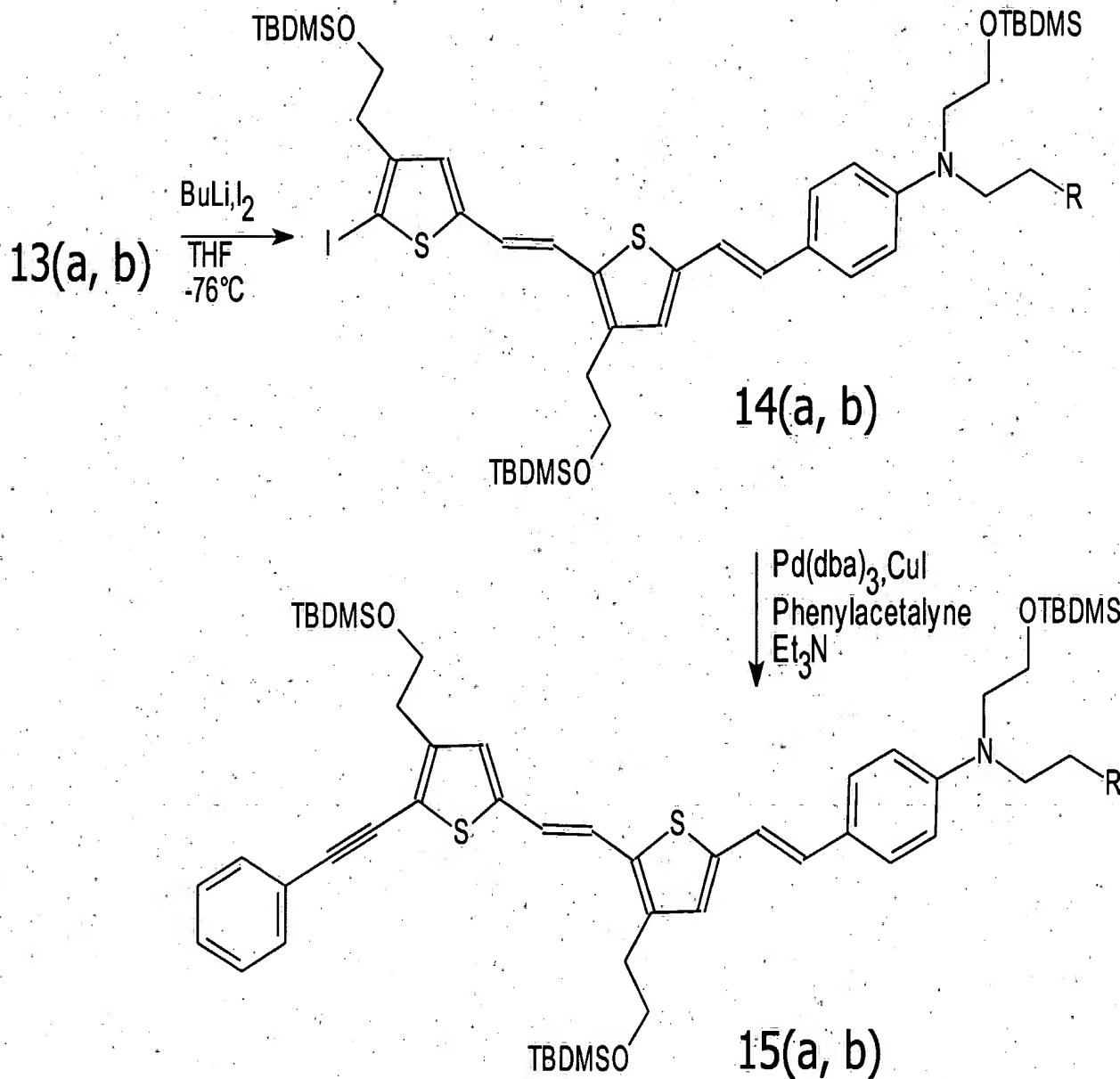


Fig.39.

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Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES  
Inventors: L.R. Dalton et al.  
Application No.: 09/912,444  
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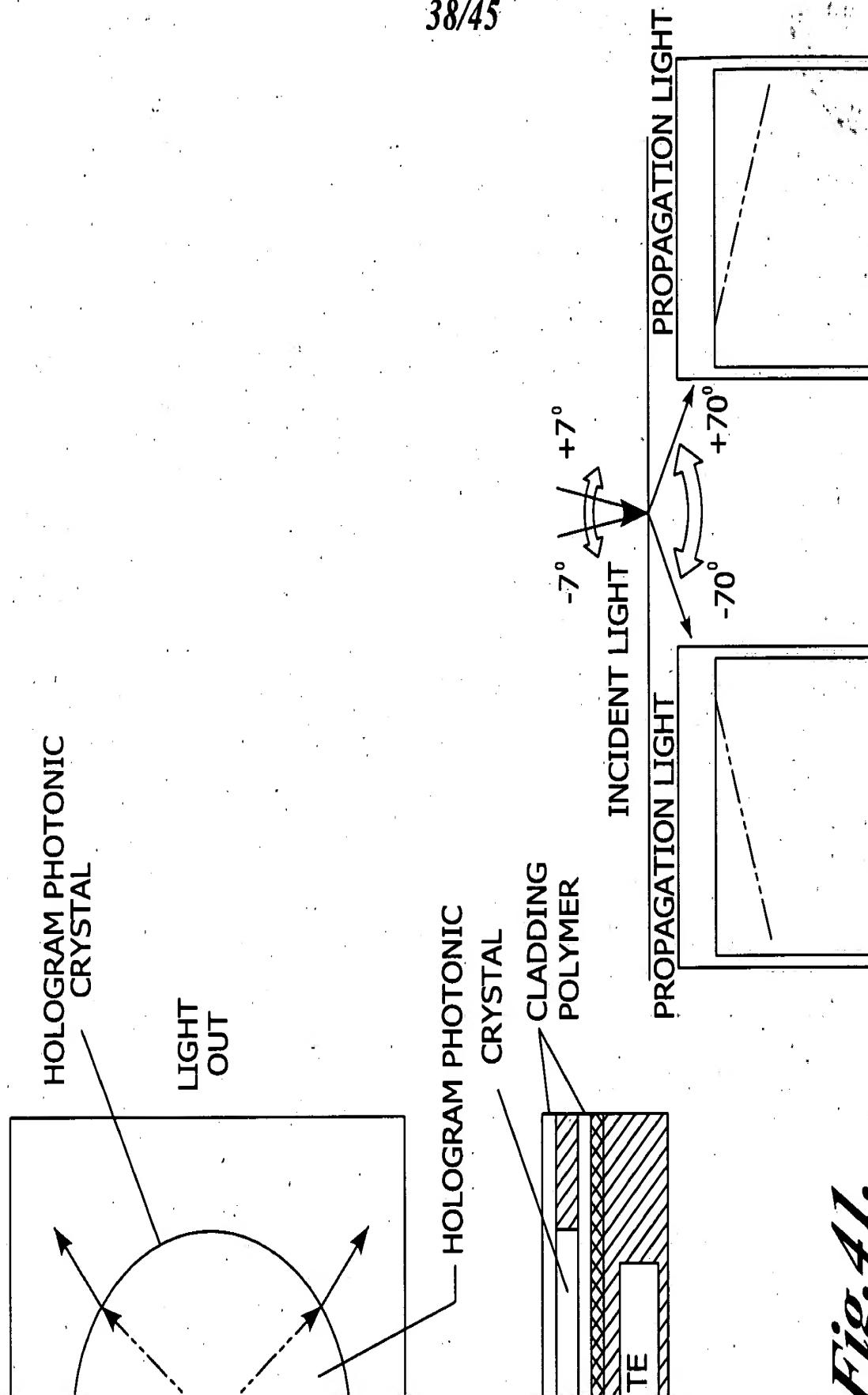
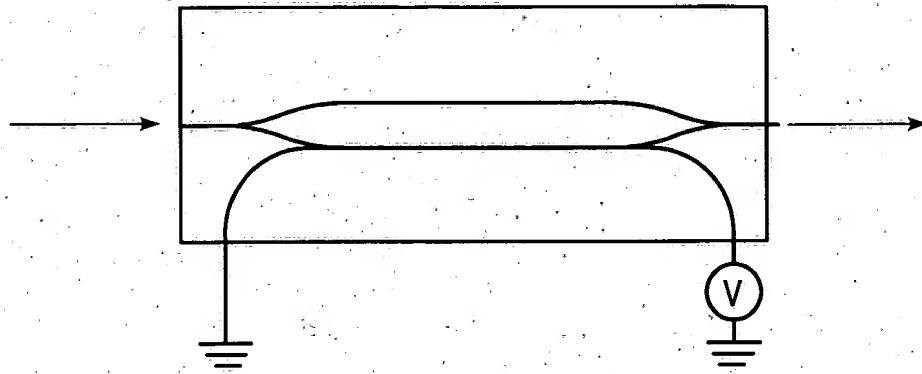
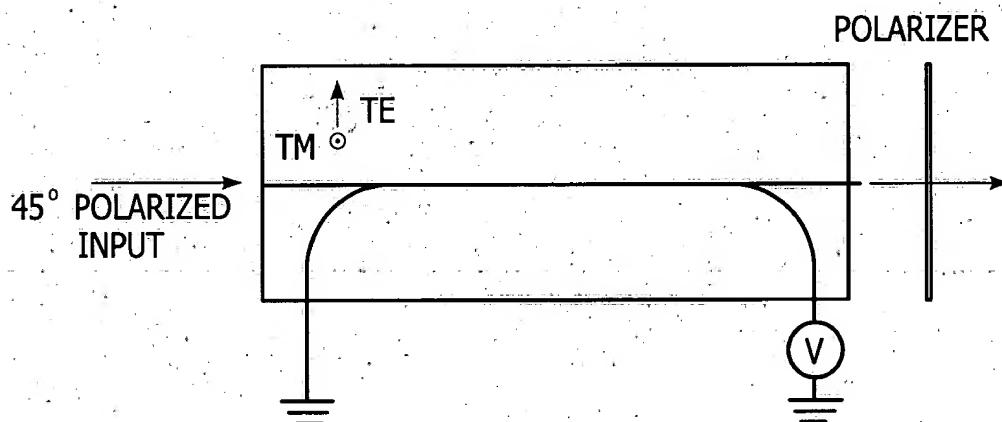


Fig. 41.

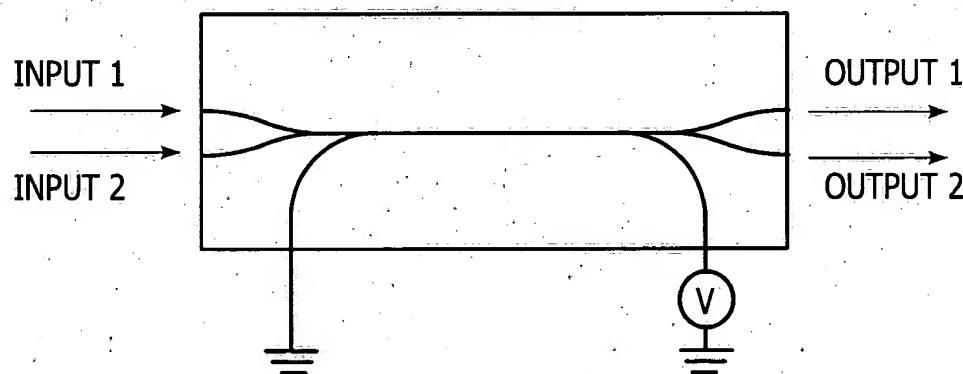
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MACH ZEHNDER MODULATOR



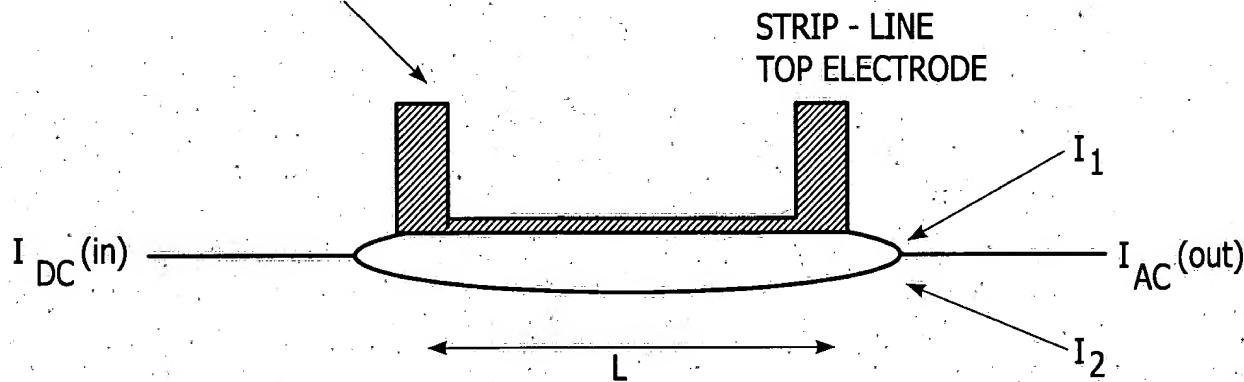
BIREFRINGENT MODULATOR



DIRECTIONAL COUPLER

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$$V(t) = V_0 \sin(\omega t) + V_B$$



$$I_{AC(\text{out})} = I_1 + I_2 + 2(I_1 I_2)^{1/2} \sin(\rho V_0 \sin(\omega t))$$

$$\rho = 2\pi r_{33} n^3 L V_0 / T \lambda$$

### COMPARISON OF KEY FEATURES OF SIMPLE DEVICES

#### MACH ZEHNDER INTERFEROMETER

$r_{eff}$

$V_\pi$

Mod.  
Power

$r_{33}$

$V_{\pi MZ}$

$P_{MZ}$

#### BIREFRINGENT MODULATOR

$r_{33} - r_{13}$

$1.5 V_{\pi MZ}$

$2.75 P_{MZ}$

#### DIRECTIONAL COUPLER

$r_{33}$

$1.73 V_{\pi MZ}$

$3 P_{MZ}$

Fig. 43.

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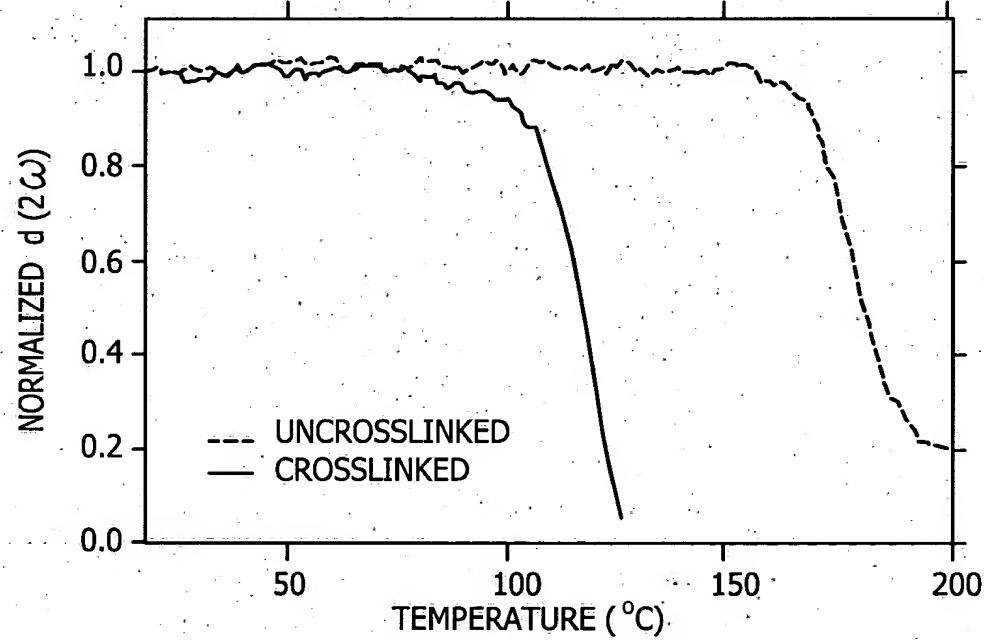
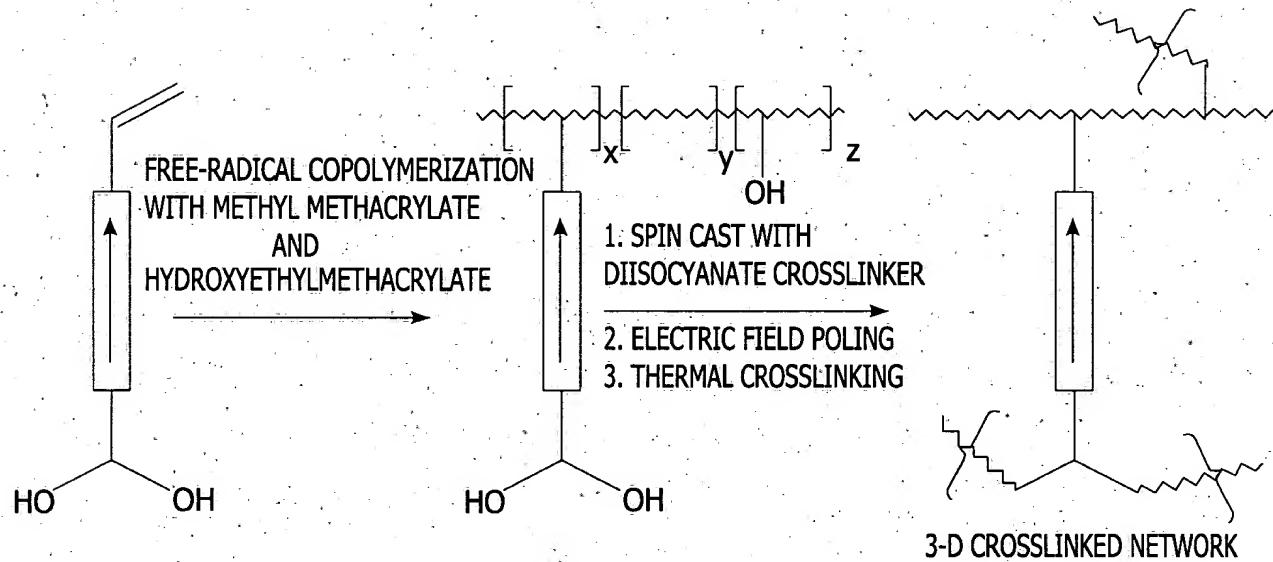
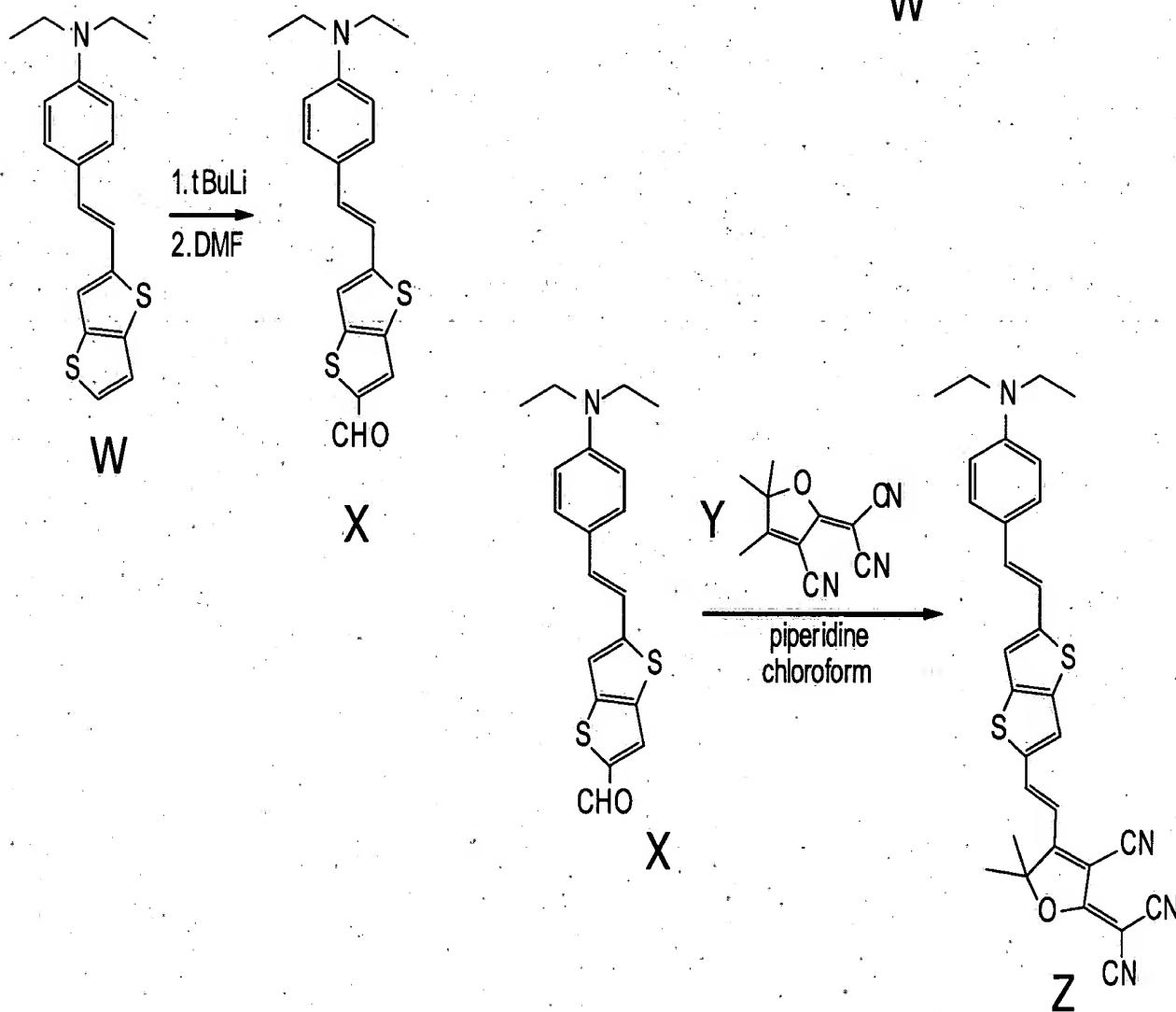
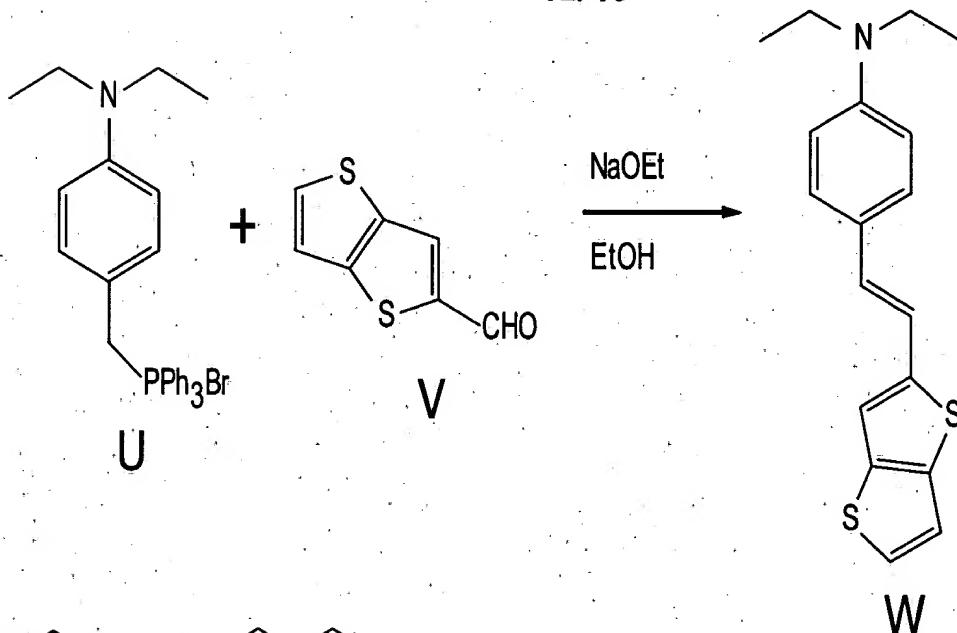
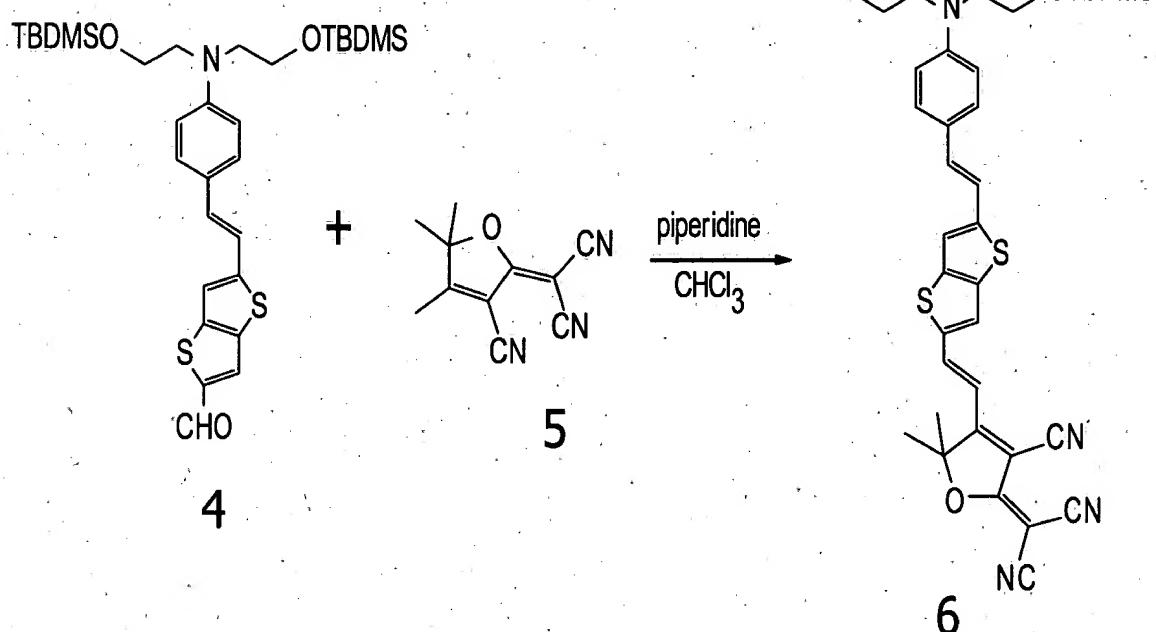
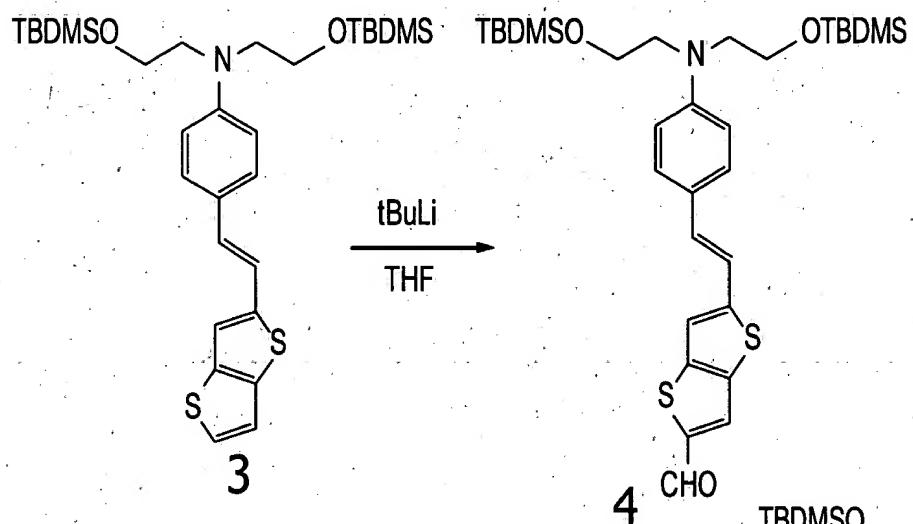
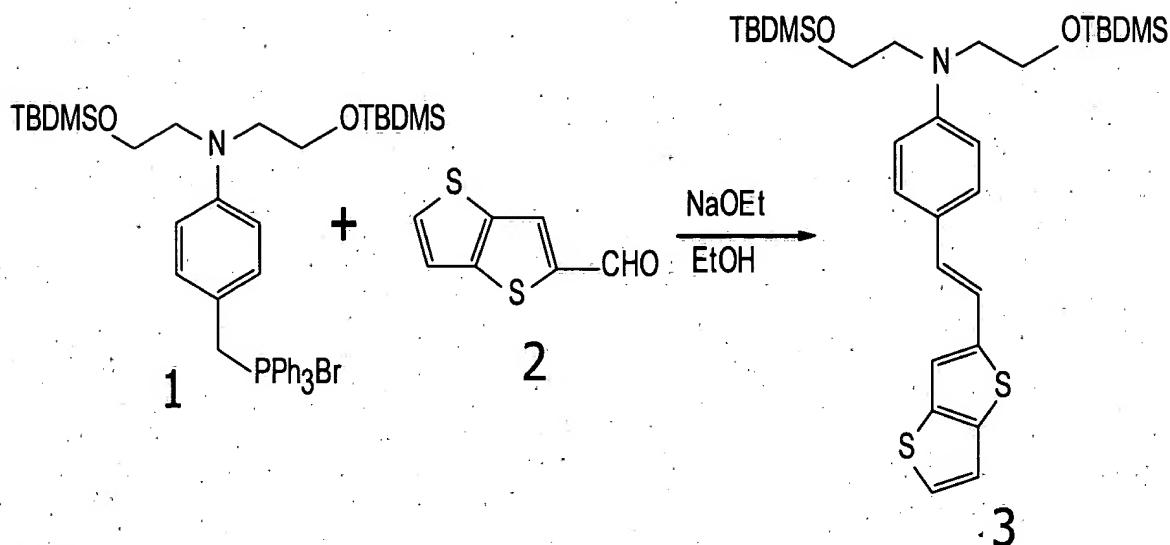


Fig. 44.

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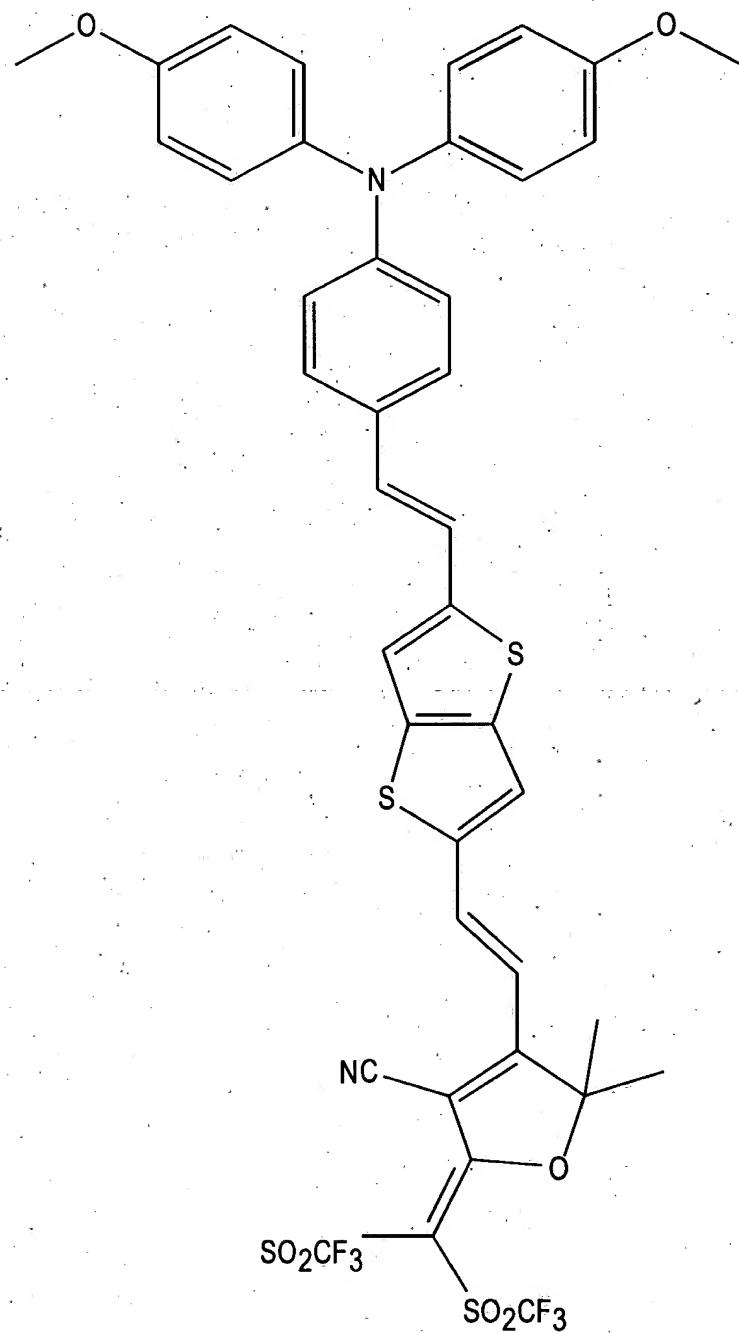


Fig. 47.

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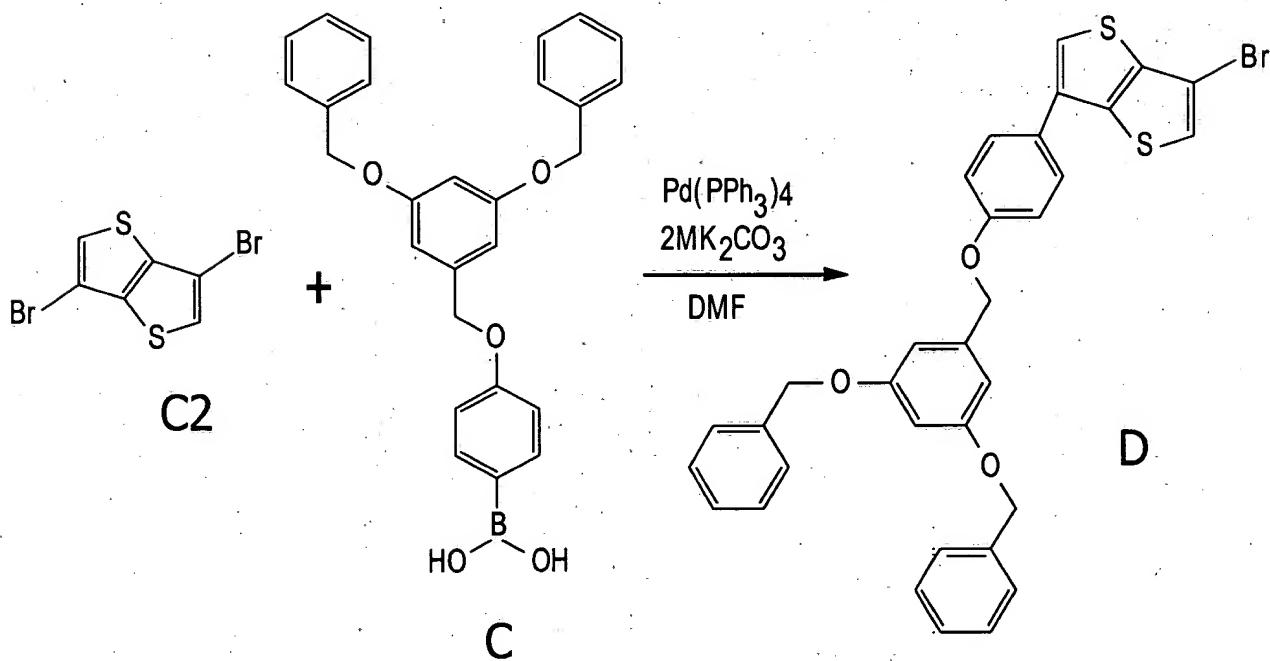
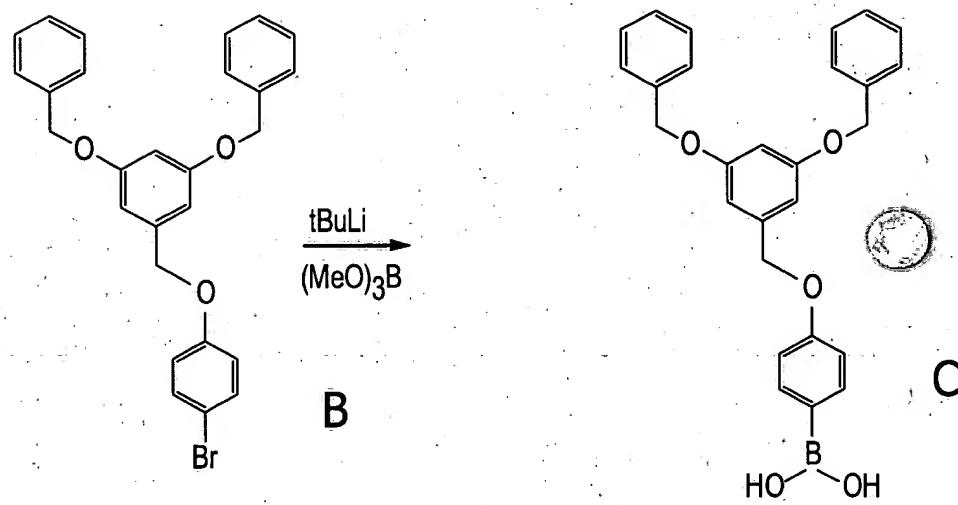
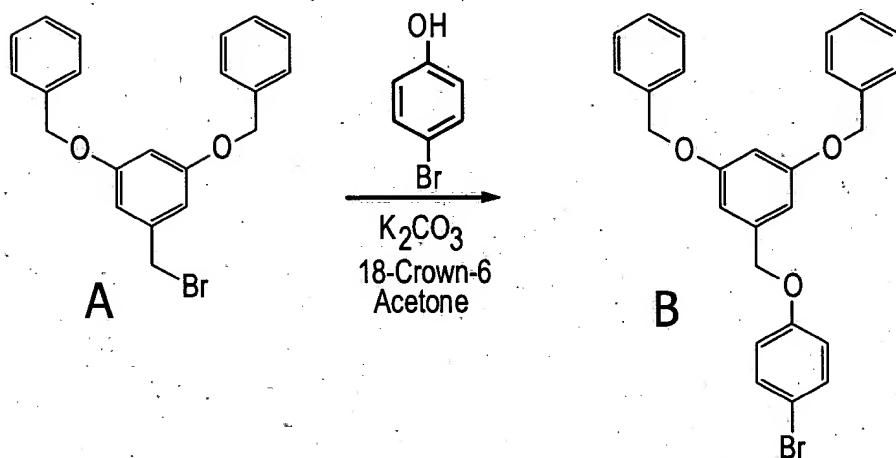


Fig.48.